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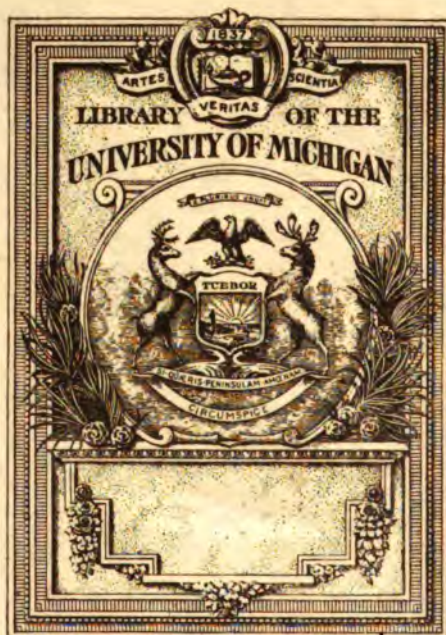
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THE ARCHIVES OF DIAGNOSIS

A QUARTERLY JOURNAL DEVOTED TO THE STUDY
AND THE PROGRESS OF DIAGNOSIS AND PROGNOSIS

FOUNDED AND EDITED BY
HEINRICH STERN
NEW YORK



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Special Articles

THE IMPORTANCE OF THE SUBJECTIVE SYMPTOMS
FOR THE EARLY RECOGNITION OF CANCER

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The ultimate aim of medical research is to discover for every disease its causative agent, the correct methods for diagnosis and a specific remedy. This goal is reached in a very incomplete and varying degree for different diseases. To state a few instances: recent research in syphilis succeeded in discovering the causative agent (spirochetæ), correct methods of diagnosis (presence of spirochetæ in the lesion, Wassermann reaction) and a true specific remedy (Salvarsan); in tuberculosis the causative agent and characteristic methods for diagnosis are well established, but a true specific remedy for it is still not obtained. In diabetes the methods for diagnosis are perfect, but causative agents as well as a specific method for treatment elude detection notwithstanding the immense mass of research done on the subject during the last generation.

In cancer the situation is worse than in any of the pathological conditions mentioned above. Neither is the etiology of cancer

known, nor does there exist at present a general characteristic method for diagnosis or a true specific therapeutic measure.

It is firmly established since the work of Johannes Müller and Virchow that a malignant growth consists of cells identical morphologically with the normal body cells. But the factors are unknown which transform these normal tissue cells into cancer cells and endow the latter with the capacity of unlimited proliferation and the capacity for replacement and consequent destruction of the adjacent normal tissue. It is of great practical significance, on the other hand, that the mass of evidence pathological, clinical as well as experimental collected thus far shows undoubtedly that cancer begins as a purely local disease and in its early stages does not affect the general health of the organism.

The malignancy characteristic of the disease manifests itself in *infiltrating growth and local dissemination, formation of metastases and cachexia.*

Cachexia is a condition of general ill health expressing itself in a peculiar pallor of the skin and profound disturbance of the general nutrition. It is probably an indication of a general intoxication of the organ caused by absorption of substances formed in the tumor. Cachexia appears generally during the late stages of the disease and a great many patients die without ever having shown the symptoms of cachexia.

Metastasis in cancer means the formation of secondary malignant growths in organs of the body located at a great distance from the primary growth. The mechanism of the formation of metastasis consists in the detachment of a group of cancer cells from the primary tumor, the transportation of this group of cells through the blood or lymph channels into distant parts of the organism, and the proliferation of these cells in the new location. It has not been determined up to the present during what period of the existence of the primary growth the formation of metastases takes place. It seems to vary greatly not only in cancers of different organs, but even in different individuals having cancer in the same organ. It is not sufficient for a few cancer cells to be transported into the liver or the lungs that a metastasis should be formed. The cells must find in the organs a favorable soil for their proliferation. M. B. Schmidt has shown in a number of autopsies groups of cancer cells in the

lungs that have never developed into metastatic tumors and the writer has shown experimentally that a metastasis grows much better in a previously diseased organ than in a normal one. It is even possible to suppose a priori that the formation of metastases may be occasionally enhanced by the general weakened resistance of the organism and that in such an instance a timely removal of the primary growth may strengthen the general organism and enable it to neutralize the cancerous emboli and thus prevent the formation of metastases. Furthermore, and this is of the greatest importance for practical purposes, a great many patients die of cancer and the autopsy does not show any metastases anywhere. Thus metastasis is also not the indispensable characteristic of the malignancy of cancer.

Consequently the most important phenomenon in malignancy of cancer is the local infiltration growth and the local dissemination with the concomitant replacement and destruction of vital organs. Cancer patients very frequently succumb either from a fatal hemorrhage caused by an ingrowth of the cancer into the wall of a blood vessel or from erosion and rupture of the wall of a vital organ adjacent to the growing tumor (stomach, esophagus, rectum, urinary bladder, etc.). It is clear then that cancer not only begins as a local condition, but continues its development as such and ultimately destroys the organism by means of purely local injuries. It is self-evident that the lack of understanding of the etiology of the disease and the absence of a specific method of treatment is of less importance than the all too frequent failure of the early recognition of the disease. The splendid results in the operative treatment of cancer achieved during the last twenty years amply show on one hand that cancer is in its beginning a purely local condition and furthermore that when attacked early it can be conquered without any specific remedy. Thus it must be emphasized again that the correct diagnosis of cancer in its early stages is the most important problem of the day. Indeed the search for such methods is one of the most important features of the work in every cancer research of the world, and it is probable that in the near future a uniform and comprehensive method will be found in advance of both the discovery of the etiology of the disease and of specific remedy, as is the case with Wassermann reaction, which antedates the discoveries of the

spirochetæ and the Salvarsan. Meanwhile it must be clearly borne in mind by every practitioner in medicine that, as well as surgery without being a specific remedy accomplishes a great deal in cancer, so can an accurate diagnosis in the very early stages of cancer be made by the aid of the various diagnostic methods in vogue at present in surgery and medicine. By the aid of methods of illumination (laryngoscopy, gastroscopy, procto- and sigmoidoscopy and cystoscopy), by the aid of chemical and radiographic analysis of the gastrointestinal tract, the microscope, the exploratory laparotomy, etc., the physicians skilled in these various methods will be able in the majority of cases to recognize the disease early enough for the obtaining of a timely radical operative cure.

The real difficulty lies in the fact that at the beginning and the early development of the disease it is not accompanied by symptoms sufficiently characteristic to cause the patient to consult a physician. What makes the situation graver still is the fact that when the physician is already consulted the symptoms are so vague that on their basis a tentative diagnosis of malignancy cannot be made. The physician whom the patient consults first is the house physician, a general practitioner. The tendency of the latter is usually to use therapeutic measures and relieve the urgent symptoms of discomfort of the patients rather than to make a thorough diagnostic analysis of the case. The result is a temporary relief of the symptoms and a continued unabated development of the malignant growth. A woman may be relieved temporarily of her uterine bleeding and offensive vaginal discharge by appropriate medication, though the cause of both is a uterine malignant growth. Symptoms of dyspepsia may be relieved temporarily though the cause of it may be an early cancer of the stomach and so on.

It is utterly impossible for the busy general practitioner to devote the necessary time to a complete chemical and radiographic analysis of the functions of the stomach for instance, even were he properly equipped for the work. But to treat his patient for weeks at a time without ever having made an attempt at a diagnosis frequently verges on criminality. Some of the cases in the experience of the writer, when hoarseness was treated for weeks by sprays, where the condition was carcinoma of the larynx, or the cases where operations for hemorrhoids were actually performed when a rectal carcinoma

was situated not further than an inch from the anus, vividly illustrate the gravity of the situation.

In view of all the aforesaid, the writer considers it of greater importance to the practitioner in medicine, in whose hands the real destiny of the cancer patient lies, to be aware of and keep constantly in mind the early symptoms of the disease. He will then be able to make a tentative diagnosis of probable malignancy and will be in a position to direct his patient to obtain a thorough diagnostic analysis of his condition before any attempt of cure or relief is made.

While there is nothing new or striking in the symptomatology of cancer as it manifests itself in the different organs and localities of the organism it is so important that every practitioner keeps them constantly in mind that the writer considers it worth while to give a brief view of the symptoms of cancer in various localities and of those characteristics of the disease which become apparent without the aid of any specialized diagnostic method. The following presents the most frequently occurring kinds of cancer accompanied by the description of their early symptoms and characteristics.

Carcinoma of the lip. A warty excrescence on the border of the lip or an ulceration with a hardened base and an infiltrated edge causing no pain in a person thirty-five years of age or over, and in whom a negative Wassermann shows that it is not syphilis, is most probably a beginning of carcinoma. At this stage the neighboring lymph glands are not involved and a wide excision of the ulceration will cause very little deformity and will give practically 100 per cent. of cures. On the other hand, if the case is treated for a certain time with salves and lotions, it very soon becomes inoperable and the chances of cure are nil.

Carcinoma of the tongue. Small wart-like formations or fissures with indurated margins on the upper or lower surface of the tongue in a person of middle age is very suggestive of malignancy and the same suspicion should arise on the occurrence of white patches "leukoplakia." Very characteristic symptoms of cancer of the tongue are decreased mobility accompanied by difficulty in deglutition and embarrassment of speech and severe lancinating pain. All these symptoms occur early in the disease and are consequently very suggestive for a tentative diagnosis. Again at this stage of the dis-

ease a wide excision will give a high percentage of radical cures while a fully developed cancer of the tongue presents the most desolate and hopeless condition of any in medicine.

Carcinoma of the cheek is accompanied in its earliest stages by a condition resembling a locked jaw. Consequently, whenever the latter condition is encountered in a person of middle age, a thorough search should be made for a possible small ulceration on the inner surface of the cheek, which may be occluded in the folds of the mucous membrane. In all these conditions the possibility of the process being due to tuberculosis or syphilis must be considered and are easily differentiated.

Carcinoma of the larynx. Hoarseness occurring in a middle-aged person and not accompanied with coughing, is a constant symptom of a beginning malignancy, and appears very early in the disease. A laryngoscopic examination will easily differentiate carcinoma from tuberculosis, syphilis, or other pathological conditions, which may cause hoarseness, and operation at the early stage of the disease gives nearly a 100 per cent. of cures. On the other hand a very slight delay may render the case inoperable.

Carcinoma of the stomach. When a person at middle age, whose stomach and bowels usually acted normally, suddenly begins to complain of loss of appetite, pressure and light pain in the gastric region, nausea accompanied with constipation interchanging with diarrhea, headache and general fatigue, the possibility of a beginning malignancy should be immediately considered, and a complete diagnostic analysis of the whole organism should be undertaken. It is not the place here to consider the comparative value of the chemical or radiographic analysis or an exploratory laparotomy. Everything should be undertaken in doubtful cases. It must be borne in mind that an abdominal incision gives no mortality, that carcinoma of the stomach give a high percentage of radical surgical cures, and that, on the other hand, when a tumor of the stomach can be felt and cachexia is present then the case is hopeless.

Many a case of carcinoma of the stomach is being treated with laxatives and gastric tonics for weeks before an attempt at diagnosis is made.

Carcinoma of the rectum. The feeling of pain and pressure in the rectum on the movement of the bowels and bleeding upon the pas-

sage of hard feces may be due to hemorrhoids as well as to a beginning carcinoma of the rectum, but to prescribe for and treat such symptoms without inspecting the anus and inserting the finger in the rectum should verge very near on criminal negligence. None the less, hardly a patient with a carcinoma of the rectum comes to the specialist without having been treated for a longer or shorter period of time by a general practitioner for hemorrhoids without an attempt at a rectal examination. Here again a timely operation gives a fair chance of complete recovery, while the usual delay caused more frequently by the family physician than the patient himself, reduces the number of radically cured cases of carcinoma of the rectum to a very small percentage.

Carcinoma of the uterus. Irregular metrorrhagia accompanied by an offensive watery vaginal discharge, occurring in middle-aged women whose menstruation either ceased or became already atypical, bleeding which occurs upon exertion or a coitus, are indications of malignancy. An early diagnosis is easily obtained at this stage and an early operation gives a very high proportion of complete recovery.

Carcinoma of the breast. Any growth in the breast in a woman of middle age is best considered and treated as a malignant condition. The investigations of Bloodgood, of Halsted's Clinic, have shown that, when tumors of the breast were operated upon at the early stage, when the diagnosis of malignancy could not yet have been made before the operation, the percentage of radical cure was over 80, while the operations on cases with the complete clinical signs of malignancy gave only 24 per cent. of cures. The loss of a breast by a woman past child-bearing age is a very slight discomfort or disfigurement in comparison with the possibility of the development of cancer. Any benign tumor of the breast may subsequently become malignant.

Malignant tumors of the kidneys and urinary bladder demand a great deal of technical knowledge and skill for their diagnosis, but the condition is always accompanied by hematuria. This symptom may be due to various other conditions (stones, tuberculosis, benign growth, etc.), and no attempt should be made at treating this symptom without a complete technical diagnostic study of the case.

This cursory analysis of the symptoms of cancer as they occur in the various clinical conditions points again to the local nature

of the disease. Local organ symptoms always predominate over the general ones. These local manifestations are in the majority of instances quite characteristic and occur in the early periods of the disease. Should they be considered of sufficient significance and be given the proper interpretation these symptoms will form as important a factor in the early recognition and consequent timely operative treatment of cancer as any of the technical methods of diagnosis which medicine possesses to-day.

THE BISMUTH MEAL X-RAY PICTURE IN DIAGNOSIS*

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From the standpoint of those who are not X-ray operators the time is ripe for an estimation of the true worth of this new method of diagnosis in internal medicine. For not only is it now readily available in all the larger cities, but by great improvement in the character of the pictures obtained and great progress in the accuracy of their interpretation, it has become a means to reckon with. Nevertheless it must be considered not merely as to its possibilities and limitations in diagnosis, *per se*, but also as to whether it can replace clinical methods of diagnosis or supplement them in a valuable way, or can merely serve in a graphic manner to corroborate a diagnosis readily made by other methods.

The regular meal used by Dr. Le Wald, our radiologist at St. Luke's Hospital, consists of three ounces of bismuth subcarbonate mixed with three bottles of zoolak, this making a bulk of about 21 or 22 ounces. For uniformity the picture is taken with the patient standing and in deep expiration. Occasionally, as a check, a picture is taken in some other position, or with some other form of meal. In colon cases the bismuth meal pictures are supplemented at a later period by pictures taken after the rectal injection of a similar bismuth suspension.

*The illustrations are from X-ray pictures taken by L. T. Le Wald, M.D., Director X-ray Department, St. Luke's Hospital, New York.

Occasionally a stereoscopic picture of the colon furnishes information obtainable in no other way; for it gives depth to the abdominal cavity and enables one to distinguish anterior from posterior objects. What seems like a kink, for example, in the ordinary plates may prove in the stereoscopic picture to be a rounded loop with one arm of the curve behind the other. Fluoroscopic examination may add certain data about motility, but its shadows are not so clear cut as in the photograph. It is a method with which I have had no experience.

I—*THE ESOPHAGUS*.—To obtain an esophageal shadow there must be an obstruction. Yet in the average case of organic obstruction there is still a passage, so that liquids are swallowed without much retardation. Consequently the ordinary bland bismuth and zoolak meal, which is regularly taken slowly by these patients, passes to the stomach almost as rapidly as it is swallowed. Hence to obtain a picture it is necessary to give a meal that is coarser in texture, and preferably one that will irritate just enough to induce spasm at the site of the lesion and so increase the obstruction for the time being. Le Wald employs pineapple or other fruit as the bismuth vehicle.

Such a meal will show obstruction due to, 1. Pressure from without, as by aneurysm, tumor or glands; 2. foreign bodies in the lumen, and, 3. changes in the walls, as carcinoma, stricture, diverticulum and spasm, whether the last-mentioned is due to an ulcer or cancer, or is idiopathic, as in the so-called cardiospasm. It also shows obstructive tumors at the cardiac end of the stomach. In many of these cases there is marked dilatation of the esophagus above the obstruction, with atony and failure of muscular propulsion; and, as shown by the bismuth meal, it is a striking observation that after the removal of an obstruction in such a case, there is frequently a rapid return of tone and peristaltic activity in the previously dilated tube.

The X-rays are not fully discriminating, however, and must be supplemented by other measures to differentiate ulcer, cancer and simple spasm.

II—*STOMACH*.—The ordinary stomach with the patient standing is of J or fishhook shape, and it reaches on the average to the

navel; with the patient lying prone it is more horizontal and higher in the abdomen.

Tone and Peristalsis.—Normally the fluid in the stomach is held up by the tonic action of the longitudinal and oblique muscle fibers, while peristalsis is maintained chiefly by the circular fibers, hence we may have tone without peristaltic activity, and lack of tone with peristalsis. Even the very atonic stomachs, those which descend to the pelvis with the weight of food, usually show some peristalsis; while the hypertonic stomachs at times show none at all.

The stomach whose lower border remains high when holding the full bismuth meal is normal or hypertonic. If the peristaltic waves are persistently absent, the wall is usually infiltrated with carcinoma, or there is fibrosis. Reverse peristalsis is occasionally seen in pyloric obstruction and ulcer near the pylorus. The hypertonic, hyperperistaltic, rapidly emptying stomach always suggests duodenal irritation; i.e., ulcer, without obstruction. If the lower border of the stomach is low in the abdomen, there is either atony or ptosis; and often in these conditions the prone picture shows the stomach three or four inches higher than in the standing picture.

Size and position have little importance except as indicating "tone" of the stomach or a general ptosis of the viscera. The X-rays are not needed for this diagnosis. A persistent mal-position suggests adhesions or a congenital anomaly.

The *shape* is of great importance in diagnosis. A portion of the fundus may be narrowed by the pressure of an enlarged spleen or the splenic flexure of the colon (which, when full of gas, may reach even to the middle line), or by the pulling down of the lower part of the sac by the weight of food in an atonic stomach. The causes of these narrowings are usually obvious. A deep indentation in the body of the stomach may mean carcinoma or ulcer with or without spasm, spasm without organic lesion, or adhesions. An obliteration of a part of the stomach, with rough or worm-eaten outline or projections into the lumen is usually carcinoma. A little roughness in the outline and failure of the viscus to move with a changed position of the patient points to adhesions. Particularly are adhesions probable if the lesser curvature is held close up to the liver, if the greater curvature and the transverse colon are held in close apposition high up, if the pylorus is held far to the right

or close to the body of the stomach, if at some special spot, as near the pylorus, the transverse colon is held higher than elsewhere, or if a portion of the stomach dilates less than the rest without causing any marked obstruction to the passage of the meal. In the adhesion area the rugæ are sometimes seen especially well defined.

A small offshoot from the regular outline, particularly if it remains after the stomach is otherwise empty, indicates a chronic perforating ulcer; if this pocket points upward it usually contains gas at its upper end. Rarely a splotch of bismuth has remained and given a small shadow after the stomach was otherwise empty. Such splotches have, in a very few cases, proven to be due to the bismuth being held by an ulcer.

Hour-Glass Stomach.—The diagnosis in this condition is often impossible without the X-rays. The constriction may be due to cancer, but if so, the cancer is usually large enough to be palpable, unless located in the fundus. Most hour-glass stomachs are due to ulcer. But an hour-glass picture is not necessarily an indication of an organic obstruction, for many of the deep sulci are spasmodic, though an ulcer may be the source of the irritation which induces the spasm. In ulcer there is, in any case, a proneness to spasm. A. E. Barclay, of London, reports that only four out of forty-two ulcers of the body of the stomach failed to give a spasmodic contraction easily detected by the fluoroscope. Hence the channel shown by the X-ray may be much smaller than that found at operation.

When an hour-glass picture is not due to a marked organic lesion at the site of the constriction, the stomach is spoken of as *pseudo-hour-glass*. A number of these have been observed and many wrongly operated upon. Hertz demonstrated that in the standing position some atonic stomachs showed a pocket of bismuth in the upper part of the fundus, and suggested hour-glass. In others, the supine position caused a separation of the stomach into two pockets. A change of position revealed the true nature of these apparent lesions.

In the pure spasmodic type the sulcus is usually seen at the junction of the middle with the upper third of the stomach; but in one case at St. Luke's it was about the junction of the middle with the

lower third. The spasmodic contraction may be reflex or possibly due to a very small ulcer, but nothing is found at operation. It is reported to be not infrequently the accompaniment of pyloric obstruction. One such case, showing both hour-glass form and pyloric closure, was operated on by Dr. Downes, and showed no hour-glass constriction at the operation, but merely the pyloric obstruction.

To make a diagnosis of organic hour-glass, the dividing sulcus must be present in both the standing and the prone positions, and at more than one examination. If spasmodic, it may disappear under massage or a hypodermic of 1-50 grain of atropine (Barclay).

The *motility* is chiefly a question of the emptying time. Among radiologists it is usually assumed that a stomach which contains a residue at the end of six hours is pathologic. A prolonged emptying time may be due to atony or pyloric obstruction; and as the pyloric obstruction frequently results in atony these two conditions may occur together. They are as readily determinable by other measures as by the X-ray, and sometimes with distinctly more certainty. For the pyloric picture in the radiograph is at times very difficult to interpret, and the bland bismuth meal sometimes allays the spasm from an ulcer.

The *water trap* or drain trap stomach is a form of atonic stomach with a low body and a high pylorus. The condition may be one of simple atony, i.e., of the pure water-trap type as described by Satterlee and Le Wald, or of atony with pyloric obstruction, and the differentiation is of great importance in the treatment.

Pyloric obstruction.—If no bismuth passes through the pylorus for quite a long time though the stomach is not atonic, and the pyloric margin of the shadow is blunt and rounded, this is presumptive evidence of pyloric spasm; but, whether the lesion causing the spasm is at the pylorus or elsewhere is a subject for further study. Two similar pictures illustrate this—one was taken one hour and eighteen minutes after the meal, and at operation showed an ulcer of the lesser curvature causing hour-glass contraction, but no lesion at the pylorus (Fig. 1); the other was taken two hours and ten minutes after the meal, and at operation showed a cicatrizing ulcer at the pylorus (Fig. 2).

It is to be remembered that in any ulcerative condition there

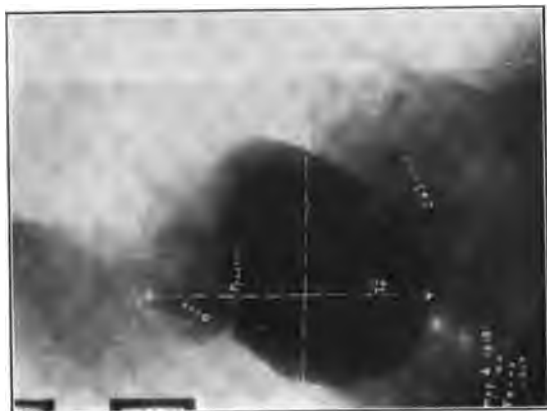


Fig. 3—Water-trap stomach—good duodenal cap—operation showed marked pyloric stenosis.



Fig. 2—Pyloric spasm—operation showed ulcer at pylorus.



Fig. 1—Hour glass stomach due to ulcer of lesser curvature—pyloric spasm—operation showed no lesion at pylorus.

THE BISMUTH MEAL X-RAY PICTURE IN DIAGNOSIS
Walter A. Bastedo

may be spasm at the site of the ulcer or at the pylorus, and that this may make an obstruction out of all proportion to the size and severity of the actual lesion itself. The X-ray shows this better than the operation, for, at operation, the spasmodic elements are relaxed by the anesthetic, and moreover the dragging force is eliminated by the supine position of the patient.

An organic pyloric obstruction is not complete unless accompanied by spasm, but the pyloric passage is narrow and often not central, and there is retention beyond the six-hour period. In normal cases, the first portion of the duodenum regularly shows as a cap of more or less triangular shape. If this is distorted or absent it usually means ulcer of the first portion of the duodenum, or adhesions; its presence or its lack of distortion does not, however, rule out pyloric obstruction, or pyloric or duodenal ulcer (Fig. 3).

A rapid emptying of the stomach, indicating a hypertonic, hyperperistaltic stomach, with an open pylorus, is suggestive of duodenal ulcer without obstruction. Such an effect is produced in animals by an experimental lesion of the duodenum (Cannon).

It has been claimed that where the stomach tube cannot be used, the presence or absence of hydrochloric acid may be detected by the liberation of gas following a dose of sodium bicarbonate, and thus a cancer with achlorhydric stomach-contents differentiated from an ulcer. But if there are stagnating contents, the organic acids of fermentation will also set free the carbon dioxide gas.

III—SMALL INTESTINES.—Ordinarily the duodenum empties rapidly and its shadow is difficult to outline. If it is readily outlined, there is some lesion either below or of the wall of the duodenum itself. The duodenum may be dilated owing to adhesions, or to an obstruction in its lower part or in the jejunum. It may be constricted by a growth, an ulcer, or adhesions, or by pressure from without, as by a gall-stone.

In the rest of the small intestines the shadows are normally not clearly defined, except near the cecum; consequently, when they are well outlined, there is stagnation. This may be seen when the site of constipation is the small intestines, as in lead-poisoning; and also when there are adhesions. If there are other indications of abdominal adhesions, it is very suggestive of tuberculous peritonitis.

At the end of the ileum near its junction with the cecum there is normally some delay, so that the bismuth shadow usually becomes well defined. In this location, partial obstruction by adhesive bands and kinks is common, and these are not distinguishable except by the X-rays.

IV—*THE COLON*.—Besides diverticuli, and obstructions due to cancer, the chief use of colon pictures is to show the cause of chronic intestinal stasis. In many "stasis" cases they point the way to surgery by showing movable cecum, adhesions about cecum, adhesions between transverse colon and ascending colon or stomach, kinks at the hepatic and splenic flexures, redundancy or adhesions of the sigmoid, partial volvulus, etc. Rarely they reveal a megacolon, or a failure of the colon to rotate to the right side, or a partial rotation with the cecum and appendix just beneath the liver.

The meal varies considerably in its effect upon the motility of the large intestine. In one patient with the very slightest degree of constipation, the bismuth induced stasis so that the bowels did not move for six days. In a number of those chronically constipated, the bismuth passed out with unusual rapidity. Two of these cases had a spastic type of constipation, and it was surmised that the bismuth had a soothing effect and lessened the spastic obstruction. In one case with movable cecum, the bismuth formed two large balls, which, a week later, had to be removed digitally from the rectum after being partially broken up by pressure through the vagina. One of these masses was at least $2\frac{1}{4}$ inches long and $1\frac{1}{4}$ inches in diameter.

V—*THE APPENDIX*.—A shadow of the appendix remaining after the cecum is empty is taken to indicate a pathologic appendix. We have had such pictures show kinks and constrictions. Very often, however, the appendix fails to show in the picture, or makes only a slight excrescence on the cecal shadow.

VI—*THE RECTUM*.—As a rule the rectal pouch is well outlined, and in dyschezia (rectal constipation) is large, and persistent for days.

SUMMARY.—These remarks may be helpful to the novice in his interpretation of "X-ray" pictures, and they indicate that we have in the bismuth meal picture a valuable aid in our diagnosis of those lesions which distort the esophagus, stomach and bowel, cause changes in their motility, or show mal-positions. Many errors have been made on account of the failure to distinguish between spasm and organic lesion; but different series of pictures, and perhaps pictures taken in different positions, will prevent such mistakes. Aside from this, positive evidence in an X-ray picture is good evidence. Negative evidence is of little value in excluding ulcer of any part of the alimentary tract, for many have been found after an apparently normal picture. It may be, however, that the fluoroscope, by revealing an interference with peristalsis at some one point, is a valuable check in these cases. The pyloric region remains somewhat of a stumbling block, though by degrees its interpretation is becoming more certain. The appendix is usually negative.

The differentiation of adhesions, cancer and ulcer is by no means always positive, but in a case of doubt the X-ray at least points to exploratory surgery. Marked abnormalities of form, as in congenital types, can hardly be ascertained by any other method.

We should caution against the attempt to diagnosticate stomach diseases by the X-rays alone, for they often fail to indicate the functional power of the organs, or the nature of the lesion; and they may concentrate the attention on shapes and positions that have no clinical significance, as would be shown by functional tests.

But where the diagnosis is not absolutely straightforward, and particularly if an abdominal operation is contemplated, it seems unjust not to give the patient the benefit of this added means of diagnosis. And where expense is of no moment, a routine use of the radiograph may give valuable information in many chronic abdominal conditions in which abnormality has been unsuspected.

It is best then to think of the X-ray bismuth pictures as a means of diagnosis of very great value; but one that is not to be used by itself alone, but only as a supplement to, or in conjunction with, other available diagnostic measures.

ACUTE GASTRECTASIS

By REYNOLD WEBB WILCOX

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Acute gastrectasis, or gastrectasia as the purists have it, is a rare condition, at least in the severer forms, although many instances of slight degree doubtless are unrecognized, because they do not actually imperil life.

Accuracy in diagnosis will be facilitated by having in mind the conditions which are either causative or associated with acute gastric dilatation. Errors in diet, to wit, an inordinate and prolonged meal with excess of fluid, often alcohol, followed by spasm of the pylorus, acute toxemia, consequent paresis of the musculature probably produce most of the deaths attributed to "acute indigestion" by the newspapers. Acute infectious diseases: meningitis, scarlatina, peritonitis and particularly pneumonia, prolonged debilitating diseases as tuberculosis in various localities, rarely malignant diseases and particularly with pronounced secondary anemia constitute most of the conditions of interest to the physician although in epilepsy and migraine acute gastric dilatation in some degree is of very frequent occurrence. It is in surgical practice, however, that acute gastrectasis of alarming proportions is most frequently encountered. Injuries to the head, deformities of the spine from disease and operations of various classes and localities, especially in the abdomen, but curiously enough in a very few instances upon the stomach itself, obstetric operations, especially Cæsarian section, are to be borne in mind. Chloroform anesthesia is more frequently causative than that with ether.

The symptoms are notable: abdominal distension with pain, profuse vomiting with thirst, scanty urine and subnormal temperature, rapid breathing and speedy collapse. The startling suddenness of the onset attracts attention and the rapid increase in the severity of the symptoms is characteristic. The fact that, with all this enormous increase in size of the upper, and later lower, abdomen, there is no muscular rigidity, is not to be ignored. Furthermore, visible peristalsis is almost invariably absent and finally the early appearing

collapse is accompanied with cyanosis. These three signs differentiate acute gastric dilatation from the various intestinal obstructions and from secondary peritonitis of different infectious origin. The picture once carefully observed is not readily forgotten.

The prognosis depends entirely upon the gravity of the conditions, doubtless a large number of patients with slight or even moderate dilatation recover without manifesting serious symptoms or even the condition being recognized. In surgical practice acute dilatation of high degree is of serious importance and it is upon those instances seen in consultation with surgeons that personal experience is based. More than one half will result fatally unless prompt and vigorous treatment is instituted. In this group the prognosis immediately depends upon the character of the treatment. Of first and most importance is immediate thorough and frequently repeated washing of the viscus with the stomach tube, every hour or two for twenty-four hours if necessary, and in rare instances, every four hours for a period of days. If lavage is done more frequently than is necessary no particular harm results. Neither solid nor liquid substances should be given by the mouth. Thirst may be relieved by proctoclysis, hypodermoclysis or high enemata of normal saline solution. Rectal feeding, of any approved type, should be continued for several days after all symptoms and signs have disappeared. Of less importance, but still never to be omitted, is the postural treatment; the head of the bed is raised and retained in that position when respiratory symptoms are pronounced, or lowered if the object is to relieve the constriction of the transverse (third) portion of the duodenum by the band of fibrous tissue which descends from the left crus of the diaphragm, or the patient is on his left side if vomiting be pronounced or the patient supine for the same reasons as would lead to the elevation of the foot of the bed. Obviously this position would be difficult or impossible after many abdominal operations. Pharmacopeal remedies play but a minor rôle; calomel followed by a saline through the stomach tube if there is no contraindication, atropin, hypodermatically, may lessen the gastrosuccorhea, relax pyloric spasm, and to this strychnin, also hypodermatically, to stimulate unstriated muscular tissue and aid respiration, and finally physostigmin, hypodermatically, to increase peristalsis when the dilatation also involves the duodenum, the

mixed type, but the last must be used guardedly on account of the depression which it sometimes causes.

The diagnosis must be made early and proper treatment instituted at once so that the prognosis may be rendered more favorable, especially after surgical procedures, than it is now commonly assumed to be.

MURPHY BUTTON ALMOST ENTIRELY DIGESTED WITHIN FOUR YEARS

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I should like to report briefly the following case of stomach surgery, as it seems to present to me, at least, a number of points of unusual interest.

The history, written out by Doctor Carl Eggers, who was at that time house surgeon at the German Hospital, is so particularly good and exhaustive, that I insert it here in toto:

"J. B., porter, German, 58 years of age, was admitted April 14, 1909, with the chief complaint of epigastric pain and vomiting.

The patient was operated on four years ago by Dr. Kiliani, for what was at that time diagnosed as an inoperable carcinoma ventriculi. (I wish to insert here that, owing to the fact that the former history is not obtainable, I am obliged to quote at this point, from memory.)

I remember that the chemical examination of the contents of the stomach was not conclusive, neither for ulcer nor carcinoma. Our experience in the year 1904, in making, as well as reading X-ray bismuth plates of ulcer and carcinoma of the stomach, was so limited, that it certainly could not have been used in confirming our diagnosis. It is interesting to note that it is quite possible, even after opening the abdomen, and inspecting and palpating the stomach, to mistake an ulcer, with its sequences, for an inoperable cancer,—a point which I shall dwell upon shortly.

The operative procedure was the same, namely, posterior gastroenterostomy.

A posterior gastroenterostomy by means of a Murphy button was done. After that, the patient was perfectly well for five months, then he began to suffer from the same symptoms as before operation, namely, vomiting and epigastric pain, but never as severe. Before operation he often vomited blood, but never after that. During all these four years whenever he got an attack of pain and vomiting, he would stop work for a week or so, until it subsided, and then resume his work. But lately attacks have become more severe, and from four to five weeks he has had continual pain in the epigastrium, with exacerbation of very agonizing pain, coming on especially at night, not after meals. He thinks pain is relieved by eating, but it returns with increased force, one to one and a half hours after meals. Pain radiates to back and is very intense there, chiefly on left side, also shoots to region of heart, never to shoulder or downward. Soon after the pain comes he has to vomit, usually one to one and a half hours after meals. Often vomits large quantities; sometimes he vomits food which he took the day before. He has not vomited blood, appetite good, but afraid to eat on account of pain and vomiting. Has lost about ten pounds. Bowels constipated, has to take cathartics. Stool usually hard and black. Urination normal.

The patient says he did not pass the Murphy button which was used for his gastroenterostomy, four years ago. Just before operation, X-ray plate was taken of umbilical region. No button seen. Another plate of region above this, was made, which showed a shadow suggesting Murphy button,—not as clear, though, as shadow of a metal substance should be.

ANALYSIS OF GASTRIC CONTENTS APRIL 15, 1909

A.C.	P.C.	A.C.	P.C.
Amount,	Amount,	Starch, negative	positive,
40 c.c.	55 c.c.	Sugar, +	Sugar, +
Little mucus,	Little mucus,	Blood, +	Blood, +
Free HCL 50,	55	Microscopic,	
Total Acid, 62.5,	77.5	Yeast,	Yeast,
Peptone, positive,	positive,	Bacteria,	Bacteria,
Albumin, “	“	Food,	Food,
Lactic Acid, negative	negative,	Blood.	Blood.

April 19, 1909, operation by Dr. Kiliani. Median epigastric incision, five inches long, through old scar. In subcutaneous tissue chromegut sutures, four years old, were seen. Liver and intestine adherent to parietal peritoneum, so care had to be taken separating these adhesions. Transverse colon brought out and held upwards. Under it was seen loop of jejunum running to gastroenterostomy. By means of this, stomach was gently drawn downward and anastomosis palpated. Contrary to expectations, the Murphy button was not felt there. Entire stomach was then palpated, and nothing abnormal felt, until the pylorus was reached, in which something flat and round was noticed, at first thought to be half of a button or an ulcer, but which on careful palpation was pronounced to be a wire spring from Murphy button. There was no tumor present, either in body of stomach or at pylorus.

Gastrostomy then done. Incision one inch long in anterior part of antrum, clamps applied to edges, palpating finger introduced. Without much difficulty a wire spiral spring from Murphy button was withdrawn from the pylorus. The latter was patent, and admitted tip of index finger. The remainder of stomach then palpated, but nothing else abnormal found. The old gastroenterostomy was carefully felt for with one finger inside of stomach and the other one outside, but no opening could be found. Apparently it had closed entirely.

Stomach incision then closed. One line of through and through inversion sutures over which was placed a line of Lembert's silk used as suture material. Tampons removed and wound closed. First, some (3) heavy silk through and through sutures inserted. Fascia and peritoneum closed by interrupted chromegut. Heavy silk sutures then tied, and skin then closed by silkworm gut."

The further course shows that patient developed at once a post-operative ether pneumonia, which led to his death, six days after the operation.

The post-mortem showed primary union of the operative wounds. Inspection of the inner surface of the stomach showed that the posterior gastroenterostomy, performed four years ago, had not closed entirely, but that a small opening had been left, permeable to a millimeter sound. Besides this, the two cylinders of the Murphy button, which fit into each other closely and thus form the canal for the new

opening of the gastroenterostomy, were lying loosely next to each other, in the stomach, wrapped up in food particles and mucus, a fact which had been overlooked during the operation.

We have, therefore, in short, the following case: A patient is suffering from an ulcer of the stomach, which is, clinically, as well as during the operation, mistaken for an inoperable cancer of the stomach. A posterior gastroenterostomy, by means of a Murphy button, is done. All the symptoms of the ulcer disappear. The gastroenterostomy opening begins to close up as soon as the pyloric spasm, due to the ulcer, subsided with the healing of the ulcer, induced by the gastroenterostomy. The Murphy button, used in the *posterior* gastroenterostomy, falls into the stomach, contrary to the usual experience, and is during an uncertain time, but certainly within four years, completely digested, with the exception of the spiral spring inserted in the male mushroom, and the male and female cylinders (found at the post-mortem).

As to the first point, of mistaking an ulcer of the stomach for a cancer, I would say that nearly every surgeon who has had a larger experience with stomach surgery, has made similar mistakes. Aside from the sometimes very indefinite information gained from the chemism of the stomach, and of the difficulty even now experienced, of reading properly bismuth X-ray plates,—the adhesions and inflammation of the surrounding parts, especially if a pronounced pancreatitis had been present, may produce a mass of such hardness and such irregularity, as to mislead the surgeon, even at the time of operation, and cause him to make a wrong diagnosis. (I must assume that the diagnosis of carcinoma of the stomach was a mistaken one, since the patient lived four years after the first operation, and showed no trace of tumor at the second operation.)

The symptoms displayed by the patient shortly before the second operation were those of retention, induced, as it was shown at the time of this operation, by the spiral spring embedded in the pylorus, in such fashion that the smallest part of the conus had entered farthest into the pylorus.

Another point of interest to the surgeon, at least, is the fact that the chromogut sutures (No. 2), employed for suture of the fascia at the first operation, were found intact and entirely unabsorbed after four years.

As mentioned before, the two cylinders were overlooked at the second operation, and were only found at the post-mortem, after the patient had succumbed to an intercurrent ether pneumonia. I have no doubt that I would have found those two particles of metal, if their presence had been suspected by me, but the X-ray picture, which I cannot reproduce, as the plate on account of its diffuseness does not lend itself to reproduction, showed only a very indistinct shadow, which was extremely difficult to interpret, and therefore, their true nature was not recognized. This is of interest in so far as the question has been raised by some surgeons, if it is not advisable as a matter of routine, to open every stomach by gastrotomy, where an ulcer is suspected, in order to convince one's self of its presence, or even to introduce an electric light into the open stomach to inspect its inner surface. I have an impression, gained from this case and a few others, that it takes considerable and special experience, for the introduced examining finger in the stomach to be able to discover an ulcer by palpation.

As far as I have been able to ascertain, the fact of a Murphy button being practically entirely digested in four years' time, by the stomach, is unique. The most exhaustive treatise on the subject of the Murphy button is found in the *Deutsche Chirurgie*, 461, 1 Hälfte, 1911, Professor Dr. H. Schloffer, "Surgical Operations on the Intestine," 1st Half, "'Anastomosis.'" Under the caption of "Button in the stomach," he says that, according to many authors, Murphy, Graff, Wulf, Cordier, Pensky and so on the falling of the button into the stomach usually does not produce any symptoms or anatomical lesions. He remarks that it is sometimes even specially mentioned in the literature that it would be quite conceivable that, if the button dropped into the stomach, it would do damage, but that such cases had never been published. As to the time a button has remained in the stomach, we need not mention the cases up to nine months, but Allis reports a case where the time was sixteen months, Quénu, Schloffer a year and a half, Wulf four and a half years, Cordier six and a half (button partly destroyed), Pensky nine years, and Patterson ten years.

I have tried to approach the question of the dissolution of a Murphy button by the gastric juice. The button used in my case

was a so-called small gastroenterostomy Murphy button, with the following measurements:

Diameter of mushroom, 23 m.m.

Height of mushroom, 8 m.m.

Inner diameter of cylinder, 10 m.m.

Height of the button, 18 m.m.

The button weighs 18½ grams. According to information gained from the manufacturer of this button, the two mushrooms, the middle plate, and the two cylinders are made of hard brass, heavily silver-plated, while the spiral in the male mushroom and the two little springs in the male cylinder, which catch in the thread of the female cylinder, are made of best German silver. The amount of gastric juice produced in one hour (according to C. Schmidt, gained from a peasant woman, 35 years old, and weighing 53 kilograms) is 580 grams. Figuring one-tenth of the weight of the body (as for the dog), we get for man, 6 to 6½ kilograms in twenty-four hours. Of this fluid, 0.2% is hydrochloric acid. This gives us approximately, 12 grams of HCl per day.

If we now consider silver as the first metal to be attacked by the HCl, it must be said that silver, at least in a highly polished state, dissolves exceedingly slowly, and forms, to a very small extent, silver chlorid. Since a saturated solution of silver chlorid in water, contains only a very small amount of HCl as compared with what the acid of the stomach contains in the same volume, it must be understood that of the acid present in the stomach, only a very small amount can come into action. But even the action of this acid is again very much retarded because precipitation at once takes place, and a complete saturation will be impossible.



SPIRAL SPRING OF MURPHY BUTTON FOUND IN STOMACH
FOUR YEARS AFTER GASTROENTEROSTOMY

(The rest of the button had been entirely digested, with the exception of the small cylinders)

Further on, the surface of the button actually only comes into contact with the acid contained in that part of the stomach where the

button is situated. Besides this, the presence of food, and especially fats, makes the action of the acid present very uncertain. It would, therefore, be unwise to figure out theoretically how long it would take, under such circumstances, for the silver-plating of the button to disappear under the action of the acid.

As soon as the silver-plating has disappeared, the action on brass, even so-called "hard brass," is much quicker. In $18\frac{1}{2}$ grams of brass we have 12.3 grams copper of the atom weight 63.6, and 6.2 grams zinc of atomic weight 65.4. It would be easy to figure out how much HCl would be required to dissolve these metals, if the action wasn't retarded by the presence of other matter.

German silver, of which the spiral spring is made, and which has, in this case, resisted the action of the acid, is composed as follows:

Nickel, 18%
Zinc, 18%
Copper, 64%

Nickel and its alloys, as it well known, is extremely resistant to the action of acids. This easily explains why the spring resisted the action of the acid. It is not as easy to see why the silver-plated cylinders, made of hard brass, should have resisted as long as the spring, but for the fact that they are inserted into each other with extremely close contact, and were held in this position until the fine hooks, which catch in the thread, became disengaged. Therefore, the action of the acid could only take place on the outer surface of the outer cylinder and the inner surface of the inner cylinder, a method which would of course retard the action considerably.

As to the final disposal of the button, it is not necessary to assume that it had all been washed away as a solution of silver chlorid and copper and zinc chlorids. But it is very possible that the button, after the smoothness of the surface had been destroyed, broke up, so to speak, into its parts and some small fragments may have been passed through the permeable pylorus. This procedure of disintegration would be superinduced by electrolytic action which may have set in.

PERIARTICULAR SUPPURATION OF PURE GONOCOCCIC ORIGIN

(WITH A NOTE ON THE VIABILITY OF THE GONOCOCCUS IN THE SOFT TISSUES)

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While it is a generally acknowledged fact that, in the vast majority of instances, cases of gonorrheal invasion of the joints subside without actual suppuration, it is well known that pus formation and the necessity for radical surgical intervention may occur. It has been assumed that these pus cases are the result of a mixed infection with the ordinary forms of pyogenic bacteria. The possibility, however, of a periarticular suppuration on the basis of a pure, uncontaminated gonococcic infection does not seem to be recognized. At any rate, the standard textbooks are silent on the subject. It is assumed that the periarthritides is a sympathetic inflammation usually in the form of a collateral edema which invariably subsides. The writer, therefore, feels justified in reporting two recent clinical observations of pure, gonorrheal suppuration in the periarticular tissues, especially inasmuch as, from a therapeutic and prognostic standpoint, it is of vital importance that the type of infection in these cases be correctly diagnosed.

Case I—M. D. Female. Married. Age 40 years. Admitted to the German Hospital, May 14, 1913. Two years ago she had an attack of rheumatism. One week prior to admission she suddenly had pains in her back and right wrist. The wrist was red and swollen, then the left wrist, left shoulder, left ankle and right knee became painful and swollen. Since the onset of the disease there has been fever and occasionally chilly sensations and sweating. There has been frequent vomiting. There have been no urinary disturbances and no leucorrhea.

Examination shows slight swelling of the left wrist with good function. Right wrist reddened, considerably swollen and complete loss of function. Left shoulder tender but not swollen. Right knee

and left ankle considerably swollen and tender. Heart normal. Temperature 101.4 deg. F. Pulse 100. No gonococci were found in cervical and urethral smears.

The case looked like one of acute articular rheumatism and was treated accordingly. Progress was slow, evening temperatures as high as 102.5 to 103 deg. F. continued for over a month, but gradually all the affected joints subsided except the left ankle, in spite of conscientious local treatment, including passive hyperemia. This ankle joint itself also seemed quite free. There was no pain on motion, which was scarcely restricted. Behind the internal malleolus, however, was a decided swelling running up above the ankle; this was very painful and sensitive. The skin was reddened and there was distinct fluctuation.

June 16, 1913, aspiration of the fluctuating mass revealed a thick, purulent exudate. Dr. Garbat reported that a culture from the pus on serum-agar showed a pure growth of gonococci.

The diagnosis and indications for treatment were now clear. Vaccine therapy was at once instituted and on June 25, 1913, I incised the abscess which ran along the tendon of the tibialis posticus and involved its sheath. Apparently the joint was not implicated in the suppuration. The pus was evacuated, the abscess wall was curetted and the cavity drained. From that time on the patient made an uneventful recovery. The temperature fell to normal and remained so, and the cavity closed up rapidly. Vaccine therapy was continued until the patient was discharged cured on August 1, 1913, with the wound healed and a normally functioning ankle.

Summarizing this case it will be seen that we had what originally looked like an acute articular rheumatism, there being no suggestion of a gonorrheal infection. This condition slowly subsided leaving, after seven weeks, an extra-articular abscess in the tendon sheath of the left tibialis posticus, behind the internal malleolus. Aspiration showed pus containing living gonococci in pure culture. This left no other inference but that the rheumatic attack was of gonorrheal origin and that there was now a periarticular suppuration which required incision and appropriate specific treatment.

Case II—R. F. Female. Unmarried. Age 20 years. Admitted to German Hospital, July 4, 1913. For about two weeks there has been pain and swelling of the dorsum of the left hand, which has

been gradually getting worse. There is a slight leucorrhea and a history of exposure to possible gonorrheal infection. There are no urinary symptoms. No history of trauma.

Examination shows a swelling and redness of the dorsum of the left hand, most marked between the heads of the metacarpals of the index and middle fingers. There is no distinct fluctuation, but the swelling is very sensitive. Motion, both active and passive, of the metacarpo-phalangeal joint of the middle finger, is very much restricted and painful. There is no evidence of an external entry for the infection. The axillary glands were somewhat swollen and tender. Vaginal smears show no gonococci. Temperature normal.

The gonorrheal nature of this infection was suspected from the beginning, although it looked, at first glance, much like a mild, ordinary pyogenic cellulitis. A moist dressing was applied and in five days distinct fluctuation was noted. On July 9, 1913, I incised the abscess, which contained thick pus. The suppuration seemed to involve only the soft parts, the metacarpo-phalangeal joint of the middle finger apparently not being involved. The wound was curetted and drained. Dr. Garbat reported that a culture from the pus on serum agar showed a pure growth of gonococci.

Vaccine therapy was instituted and the hand was bathed and baked. The wound healed slowly. During the convalescence an arthritis of the right hip developed which subsided after two weeks.

Even when the wound was healing motion in the metacarpo-phalangeal joint of the middle finger was greatly impaired and a crepitus was noted on examination. A röntgenogram taken by Dr. Stewart, August 11, 1913, showed considerable destruction of the articulating surfaces of the bones of this joint, particularly in the head of the metacarpal.

The patient was discharged cured on August 23, 1913. The wound was healed, motion of the third metacarpo-phalangeal joint was limited.

This case, then, was an infection of the dorsum of the hand which on casual examination simulated an ordinary pyogenic phlegmon, although there was no external evidence of where the infectious material had entered. Incision of the abscess in the soft part showed pus containing living gonococci in pure culture. Later röntgenographic examination showed destruction of the metacarpo-

phalangeal joint of the adjacent finger. In all probability this joint was primarily affected and the abscess of the dorsum was an extension from the joint inflammation. The condition yielded to incision with proper specific therapy.

In connection with these two cases of suppurative gonorrheal peri-arthritis, I desire to call attention to a popular misconception which has followed a publication by Baur, from v. Bergmann's Clinic, in 1901 (*Ueber gonorrhöische Arthritis*, *Deutsche med. Wochenschr.*, 1901, No. 8). As a result of his observations on twenty-seven cases of gonorrheal rheumatism he concluded that the gonococcus did not live after the sixth day of the disease, and that in the tissues surrounding the joint gonococci were not present. The peri-arthritis, he assumed, was due to a toxin irritation. These conclusions of Baur were called to my notice by a recent article of Heinrich F. Wolf's ("Massage in the Acute and Subacute Stage of Gonorrheal Rheumatism," *New York State Jour. of Med.*, 1913, Volume 13, 379). Partly on the basis of Baur's results, Wolf advocated early massage (i.e. two weeks after the onset of the disease), as a perfectly safe measure in cases of acute and subacute gonorrheal arthritis.

The incorrectness of both of Baur's conclusions is self-evident from my two personal observations. Not only is the living gonococcus found in extra-articular lesions, but it may be found as late as seven weeks after the inception of the disease.

Conclusions:

1. A periarticular suppuration of pure gonococcic origin may exist which may simulate an ordinary pyogenic tendosynovitis or cellulitis. It apparently follows an arthritis of the neighboring joint, which in itself may be non-suppurative. The articular and peri-articular lesion may be absolutely distinct anatomically.

2. The history of a gonorrheal infection, the existence of a urethritis, the previous articular lesions, the absence of an external point of entry for the infection, and the presence of gonococci in the urethral or vaginal secretions may suggest the diagnosis. The certain diagnosis is made by the finding of gonococci, preferably demonstrated by culture, in the purulent exudate.

3. The condition is subacute and offers a good prognosis if the

pus focus is promptly incised and the systemic infection combatted by proper vaccine therapy.

4. Baur's contentions that in gonorrheal rheumatism, the gonococcus does not live after the sixth day of the disease and that the gonococcus cannot exist in the soft tissues around the joints are both conclusively disproven.

DYSMENORRHEA

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Dysmenorrhea may involve the system generally, in its reaction to the regular monthly stimulation produced by the secretion of the ovaries, or it may involve the uterus as it reacts to the local changes produced in the mucosa, in the uterine wall, and in the cervix by the premenstrual congestion and the resultant outflow of blood into the uterine cavity. To these must be added the processes involved in the outflow of this blood through the cervix into the vagina. In the pre-menstrual stage, there is an increased flow of blood into the uterus, there is a hyperplasia in the mucosa, there is a state of plethora in the genital tract which can be recognized by a sensation of fullness in the pelvis and by the bluish discoloration in the upper part of the vagina, and in the cervix, visible to the eye. In a uterus imperfectly developed, in the so-called hypoplasias, when the ovaries are normal, pain and discomfort may be experienced before the outflow of blood. This type of dysmenorrhea, occurring before each menstruation, and oftentimes relieved by menstruation is frequently seen in young girls and in the unmarried and represents the form benefited or relieved, in many instances, after marriage. The large proportion of cases of dysmenorrhea, however, can be readily understood, if each menstruation is to be considered as a miniature labor. We have the outflow of blood, we have the dilatation of the cervix, we have the contraction of the uterus. In labor, we have varying degrees of pain, depending much on the individual ability to stand pain

well, or poorly. The same conditions hold good in many of the cases of dysmenorrhea: there is a hypersensitive uterus, or the patient is constitutionally of the hypersensitive type. Aside from this question which has to be taken into consideration, comes the mechanical question, first, of the cervix, the degree to which it dilates, the degree to which it allows the blood to pass out; then comes the question as to the clotting of blood, and whether the outflow through the cervix consists of fluid blood, or of clots. Above all comes the question of uterine contraction, for it is the uterine contraction which produces the pain or colic, which we call dysmenorrhea. How much of this pain or colic is produced in the mucosa itself, as the blood pours out of the capillaries, how much is produced by a uterus which contracts excessively even if the outflow through the cervix is a ready one, and how much results through obstruction in the cervical canal, which causes the uterus to contract, in order to force out the fluid or clotted blood, is a point which has to be determined in every case. The actual diameter of the cervical canal, as measured by the sound, never tells us whether a dysmenorrhea is an associated condition. The cervix may be so narrow as to scarcely admit the smallest sound, and that particular patient may not suffer from dysmenorrhea. Another cervix may be exceedingly roomy on entrance of a sound, and yet dysmenorrhea of the so-called obstructive type may be present.

In the pre-menstrual period, the lining of the cervix and of the uterus at the level of the internal os may become exceedingly swollen, forming a ring of adenoid tissue, which may allow a sound to readily pass through, but which may serve to obstruct the outflow of blood from the uterine lining. Whether excessive uterine contractions are due to uterine hypersensitiveness, or to excessive stimulation by the ovarian secretion, or to forcible attempts on the part of the uterus to expel blood through an obstructing cervix, or whether the pain be due to such contractions of the fibers that dilate the cervix with the same pain as in the first stage of labor, these are points which must be diagnosed in order to determine the correct procedure for relief, if relief be possible.

To perform a surgical dilation of the cervix and to make this dilation more or less permanent by the use of an intra-cervical stem or by a cutting operation without first knowing that the cervix is the main offender, leads often to a disagreeable disappointment. I be-

lieve it to be possible in many cases to discover whether or not the cervix is the sole offender. If we are able in a painless manner, and without danger of infection, or of injury to the tissues, to dilate a cervical canal two or three days before menstruation, or even when the pains have begun, and if by this dilation we relieve the patient of the dysmenorrhea, we prove to our satisfaction the cause of the menstrual pain. If, to make the cure a permanent one, any surgical procedure is then made use of, it is done with a very fair degree of certainty, as to the ultimate result.

The only painless and non-injurious method of dilating a cervix in office practice, which I have found to be advisable, is that with the aid of the galvanic electric current. Aluminum sounds of various diameters are used, always of a caliber smaller than the size which might be used if a little force were applied. A large plate is applied to the abdomen, or under the sacral region, the negative pole being the intra-uterine one, and a current of from 5 to 10 milliampères is used for a period of 5 to 15 minutes. The action of the negative pole within the cervix causes a relaxation of the fibers with a resultant dilatation of the canal so that the intrauterine sound slips out, as if a grasping hand had opened. At the same sitting, or at the next application, the first electrode may be changed for one somewhat larger, and this may be repeated as judgment dictates, always drawing the electrode out as soon as the patient experiences pain or discomfort. The negative pole within the cervix produces, especially if a white or yellow secretion be present, an oxidation of the secretion with the resultant production of a bubbling composition such as H_2O_2 , produces with a purulent discharge. If the electrode fits too closely in the cervix, and there is no egress for this product, there is an increase of pressure within the uterine cavity, and in the cervix and pain results. If 1, 2 or 3 treatments on successive days before the onset of menstruation and its associated pain, result in a painless menstrual flow, it is a fairly satisfactory proof that the cervix plays an important part in the production of pain in this particular individual.

I have in many cases given patients relief by this method from the uterine colics produced by cervical causes. And in the large number of instances where the pain was sufficient to warrant permanent relief, and the diagnosis of cervical causation was made by this pro-

cedure, surgical relief afforded the means for permanent cure. To assure a patient that the cervix, because of its length or rigidity or because of its stenosis, or undue contraction is the primary factor in any case of dysmenorrhea without using an aid such as the above in making the diagnosis is to tread on very uncertain ground. The large number of recurrences of dysmenorrhea after surgical operations on the cervix prove the truth of this observation.

THE PROSTATIC INCIDENT IN DIABETES

By HEINRICH STERN

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Since my first publication on the concurrence of the prostatic and diabetic states (*Am. Jour. Urology*, May, 1908), nothing on this subject has appeared in literature, so far as I am aware. And yet the association of these pathologic circumstances is so frequent and of so great a clinical importance that it should arouse the interest of both the internist and the surgeon.

To the apparent unconcern of the internist in matters urogenital and of the genitourinary specialist in matters internal must be assigned the failure of recognizing the co-existence of these conditions, or of properly appreciating, be it merely from the standpoint of therapeutics, the significance of the clinical combination.

The status prostaticus of the diabetic is commonly overlooked by the family physician, who is wont to ascribe certain symptoms of prostatic disease to the diabetic syndrome. The difficulty in starting micturition, for instance, is often referred to a neurotic quality underlying the diabetes or accompanying it, and the frequent desire to urinate, especially at night, is usually deemed *prima facie* evidence of the diabetic affection.

While the prostatic state, which is the consequence of hypertrophy of the gland, is generally not established in the otherwise normal individual before the sixtieth year of life, it may ensue in the diabetic ten, twenty and even thirty years earlier. A similarly early status prostaticus I have observed in a number of gouty persons, in angiosclerosis, and in a few patients in whose urine large amounts

of calcium oxalate had occurred for some time. This early prostatism in the diabetic may be the result of a gonorrheal prostatitis in which the sugar-laden urine participated in the perpetuation of the inflammatory processes, and hence in the production of the hypertrophic changes of the gland.

However, many diabetics with chronic prostatitis or its sequence, hypertrophy of the gland, give no history at all of a gonorrheal invasion, or they were affected with gonorrhea at a youthful age and had made a prompt and complete recovery therefrom. In these instances, there stood either another infection at the foundation of the inflammatory process, or the pathologic changes were evoked by the urinary glucose directly, or by nutritive or secretory disturbances of the gland.

Of the non-gonorrheic infections of the prostate that with the colon bacillus is undoubtedly the most frequent; Virghi's assumption, however, that chronic prostatitis is always a mild toxic infection of the gland occasioned by the colon bacillus (*Zentralblatt f. innere Medizin*, 1907, No. 21) is too absurd to merit serious consideration. A number of other microorganisms may give rise to prostatic inflammation. Again, yeasts and fungi find a suitable soil for development in the diabetic urine even when this is still contained in the bladder. The frequent occurrence of cystitis, pyelonephritis, prostatitis and other inflammatory states of the genitourinary tract in the diabetic may be occasionally due to the activity of these yeasts and fungi, and among the latter especially the sarcines. Again, it is probable that an inflammatory condition may be set up by the direct action of the urinary glucose upon the portions of the urinary tract which are traversed by it, and more particularly there where a urinary stagnation is apt to occur.

Although the great majority of prostatides appear of microbic origin, there occurs a certain proportion which, like the early prostatism of diabetics, may be the result of systemic influences. The influence of general disease and systemic deterioration upon the production of prostatic inflammation and degeneration is not sufficiently recognized and even denied by some. It is evident, however, that systemic disease and early decline may be reflected by the nutritive and secretory disturbances of the prostate gland, and that they may therefore be the progenitors of degenerative changes in the

latter. I have shown elsewhere (Am. Jour. Med. Sci., Aug., 1903) that the prostate is rather a part of the sexual than the urinary apparatus, and that its secretion is of the utmost importance to fecundation—a fact which again evinces the dependence of prostatic energy upon the systemic state of health.

Prostatides of non-infectious causation, viz.: pathological conditions of the prostate which are often associated with angiosclerosis, athyroidism, gout and diabetes mellitus, terminate mostly in a true hypertrophy of the entire gland. The early prostatic state in diabetics is much akin to the same condition consequential to senile hypertrophy of the prostate, but while in senile degeneration the enlargement may be occasionally limited to one or two lobes of the organ, the increase in size in early non-infectious hypertrophy usually involves the bulk of the gland if the patient remains alive sufficiently long. Again, in prostatic disease of infectious origin, partial, segmental enlargement of the gland is the rule.

The pre-senile prostatic state appears at the onset in the form of transitory seizures. Gradually the attacks diminish in severity and attain a certain degree of chronicity. The prostatic state becomes firmly established when it has assumed a definite chronic character. Vesical involvement is as frequently the sequel of the prostatic state in the young as it is of glandular degeneration in the aged.

Prostatic disease and diabetes may be associated as follows:

First. Prostatic disease of infectious origin may antedate the diabetic state.

Second. Senile hypertrophic changes in the prostate may exist prior to the outbreak of diabetic phenomena.

Third. Prostatic disease may be the result of the diabetic urine.

Fourth. The prostatic state may be the consequence of the self-same causes which give occasion to the diabetic deterioration or it may be a direct result of the latter.

The first and second eventualities have an actual interest for us in the present connection only to the extent that the supervening diabetic condition interferes with an improvement of the prostatic affection of microbic causation and tends to accentuate the untoward prostatic phenomena in the aged. In both eventualities prostatic affection and diabetes show no relationship as far as the origin of

one from the other or their production by one common factor is concerned.

The third eventuality, the causation of prostatic disease through the agency of the sugar-containing urine, be it on account of the activity of yeast and fungi rapidly developing in it or on account of the immediate operation on the glucose, represents more than a mere accidental occurrence. Chronic prostatitis prevails frequently in the diabetic, but as the affection does not always manifest itself by pronounced symptoms its existence is either overlooked or disregarded as a general rule. Again, an abnormal condition of the prostate, though not infrequently associated with involvement of the seminal vesicles, is very often overshadowed by a synchronous pathological process in the bladder. While in the pertaining instances the bladder involvement is usually the consequence of the prostatic disease, the cystitic phenomena may be very much in evidence and the changes in the prostate are not discerned. Thus, it happens that we speak of the frequent occurrence of cystitis in the diabetic and entirely forget that in the male patient there may be an enlarged gland which stands at the foundation of the bladder complication.

The fourth eventuality of the connection of prostatic disease and diabetes—their origin from a common cause or the origin of prostatism from the diabetic state—is beyond question the most interesting. The prostatic state of this association has arisen on a purely systemic basis. In this, and in every other respect, it does not materially differ from the true status prostaticus of the aged. The main points at variance are that the prostatic hypertrophy occurring on the foundation of a constitutional disease or anomaly may be fully developed at a comparatively early period of life, and that the prostatic state resulting therefrom is usually associated with hypertrophic changes involving the greater part of the prostate gland.

The prostatic enlargement in this form of prostatism, for which I proposed the term *constitutional prostatism*, is, like all other hypertrophic changes of the gland, in all probability the consequence of a more or less chronic inflammatory process which, however, does not start in the prostatic urethra but in the bloodvessels and connective tissue structures of the gland itself. It is primarily an affection of inadequate or perverted blood supply, due in some instances to local or general angiosclerosis, in others perhaps to cer-

tain irritating or toxic elements circulating in the blood current. In constitutional prostatism, the changes in the prostate are of similar character as those found in other glands. We have connective tissue or epithelial hyperplasia, or both, and in accordance with the preponderance of the former, more or less atrophic changes in the far-advanced instances of the affection.

Diabetes, like some other abnormal systemic state, may be the cause or precursor of constitutional prostatism. The two conditions are frequently associated, but the prostatism is generally overshadowed by the diabetic phenomena, and it is nearly always overlooked on account of a certain similarity of its syndrome and that of diabetes, and of its occurrence at a rather early period of life.

The following case-history will give a fair illustration of the concurrence of constitutional prostatism and diabetes:

J. C. F., 32 years old, born in U. S., farmer, single, came under my observation in April, 1905. Family history good. Patient never had any venereal disease. In June 1904, the symptoms of diabetes supervened. Very soon afterward those of prostatic disease made their appearance. The local physician, suspecting diabetes, did not recognize the presence of the prostatic affection. Without a physical examination of the prostate, a microscopical examination of the urine and the expression urine, and the securing of residual urine, it was well-nigh impossible to discern prostatic disease, for many of the symptoms displayed by the patient pointed as much to the diabetic as to the prostatic state. There were the frequent micturition during the day as well as the night, the sexual impotence and the train of nervous symptoms common to both conditions. The patient had lost about fifty pounds in the past ten months and presented the picture of premature old age.

For brevity's sake I abstain from recounting the physical findings, which are of no especial interest to the present consideration. The heart appeared hypertrophic with a distinct mitral systolic murmur and accentuation of the aortic diastolic sound. The blood pressure, ascertained over the radial artery by Potain's instrument, amounted to 220 m.m. Hg. The superficial veins of the thorax, the long and short saphenous veins and the hemorrhoidal plexus were abnormally engorged. There was a distinct tumefaction, quite painful on deep pressure, in the region of the pancreas. The liver ex-

tended somewhat below the arch of the ribs and its margin felt flabby on palpation. The inguinal glands were indurated. The prostate was much enlarged and its palpable portions appeared rather hard and uneven on the surfaces. The residual urine amounted to 110 c.c.

The microscopical examination of the urine and that of the expression urine left no doubt as to the presence of inflammation and degeneration of the prostate and of chronic cystitis.

The treatment directed toward amelioration of the diabetic symptoms also afforded relief of the subjective prostatic phenomena. The degenerative process in the prostate and the inflammatory state of the bladder seemed to have come to a temporary standstill. The pus corpuscles and the various kind of epithelia in the urine and expression urine became markedly diminished, the ammonium contents of the urine became decreased and an acid reaction was present on numerous occasions. At the period of the greatest general improvement the residual urine did not exceed 25 or 30 c.c., and the prostate gland seemed to be softer on palpation. Later on, the prostate caused very little discomfort even then when the diabetic deterioration had made very pronounced inroads.

The patient succumbed to the diabetic deterioration in December, 1907. The direct cause of death were gangrenous phlegmons over the course of the saphenous veins which were found engorged on the occasion of my first examination of the patient.

EPISTAXIS AS AN EXPRESSION OF SYSTEMIC DISEASE

By HAROLD HAYS

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A prolonged epistaxis is of frequent occurrence and is usually a manifestation of some internal disarrangement of the system. What the precise factor in the causation of the hemorrhage is, is not always easy to find out. It is often necessary to watch the patient for days

for some other symptom or symptoms which will indicate the true state of affairs.

It is a simple matter, as a rule, to eliminate local factors which will cause a nasal hemorrhage. Local injury or ulceration or a malignant growth are readily diagnosed and their local treatment will tend to alleviate the condition. However, when the hemorrhage is but a local expression of systemic disease, not only must the hemorrhage be treated locally, but the patient's general condition must receive the greatest care and attention.

In a paper read at the New York Academy of Medicine three years ago (*Epistaxis in its Relation to Various Constitutional Diseases*, N. Y. Med. Jour., Sept. 24, 1910) I very carefully reviewed the numerous constitutional conditions with which epistaxis is so frequently associated. Of course this list includes many maladies with which the hemorrhage is incidental. But there are others, such as the anemias and other blood conditions, and circulatory diseases in which the nose bleed is a serious indication and in which the stoppage of the bleeding is often concomitant with improvement in the patient's general condition.

The systemic diseases of which epistaxis is an expression may be divided into seven groups as follows:

GROUP I. INFECTIOUS DISEASES

Typhoid fever, measles, scarlet fever, diphtheria, whooping cough, cerebrospinal meningitis, pneumonia, influenza, erysipelas, smallpox.

GROUP II. ANEMIAS AND OTHER BLOOD CONDITIONS:

- a. Anemias; secondary anemia; chlorosis; pernicious anemia.
- b. Hemophilia, leukocythemia.
- c. Purpura hemorrhagica (rheumatism), scurvy.
- d. Malaria.

GROUP III. CIRCULATORY DISEASES:

- a. Diseases of the heart: Mitral stenosis, tricuspid stenosis, congenital cardiac disease (usually associated with polycythemia), aortic insufficiency, disease of the coronary arteries and aneurysm.
- b. Diseases of the liver: Cirrhosis.

- c. Diseases of the kidneys: Chronic interstitial nephritis.
- d. Diseases of the bloodvessels: Arteriosclerosis, (α) apoplexy, (β) endarteritis obliterans.

GROUP IV. RESPIRATORY DISEASES:

Chronic bronchitis and emphysema, pleurisy with effusion, empyema and tumors pressing on the lungs.

GROUP V. SPECIFIC LOCAL INFLAMMATIONS:

Syphilis, tuberculosis, leprosy, carcinoma.

GROUP VI. MISCELLANEOUS DISEASES:

Vicarious menstruation, caisson disease.

GROUP VII. DRUG POISONING:

Phosphorus, chloralamid, salicylic acid compounds.

The peculiar anatomical conditions in the nose may account for the numerous hemorrhages which take place there instead of in other parts of the body. The blood supply is unusually large. The anterior and posterior ethmoidal vessels, originating from the ophthalmic, supply the ethmoidal cells, frontal sinuses and roof of the nose. The sphenopalatine artery, arising from the internal maxillary, supplies the mucosa of the turbinates, the meatuses and the septum. The inferior artery of the septum arises from the superior coronary, a branch of the facial. These vessels form a close plexiform network. The mucosa of the nose offers a peculiar lack of resistance as the tissues are intimately connected with bone, thereby limiting expansion. Moreover, even with the intimate relationship of veins and arteries, the return of blood through venous channels is impeded because of the flimsiness of the surrounding structures. In the case of lowering of vital resistance through disease, the tissues become engorged, the venous return flow is impeded and some vessel must give way under the increased strain, either artery or vein.

Sir Morrell Mackenzie, thirty years ago stated that the constitutional causes of nasal hemorrhage may be due to: 1. Alterations in the constituents of the blood; 2. disease of the bloodvessels; 3. obstruction to the circulation causing a strain on the whole system; 4. vicarious hemorrhage. In general these four causes hold

good to-day but to them may be added, 1. that epistaxis often may be and is caused by a lowered resistance of the tissues due to various chemical and bacterial toxins; 2. epistaxis may result from a pathological change in the nasal mucosa due to a local infection at this site but caused by a general disease.

Although epistaxis may be an expression of systemic disease in any of the affections enumerated above, its seriousness is of little import except in those diseases which affect the heart and bloodvessels. I realize that diseases of the blood such as the anemias, hemophilia, leukemia, etc., may give rise to various severe hemorrhages but these are not the life and death hemorrhages which one so often sees associated with arteriosclerosis, myocarditis and so on. A ruptured bloodvessel in the nose in a case of arteriosclerosis is frequently a worrisome affair and baffles the skill of the rhinologist and the internist. The following case illustrates this:

A. W., 45 years old, had always been perfectly well. He drank and smoked immoderately. Weight, 230 pounds.

On the morning of November 23, 1910, there occurred a sudden, spurting hemorrhage from the left nostril. A physician was called in who packed his nose firmly which slightly diminished the amount of bleeding. About three hours after the onset, I was called in and I immediately recognized, as he had, that the patient had saved himself from an apoplexy and that the important thing was to reduce the blood pressure which at that time must have been well over 200. He was given a hypodermatic injection of one-sixth of a grain of morphin and one seventy-fifth of a grain of nitroglycerin. On removing the packing from the nose, which had been inserted some time before, there was a profuse arterial hemorrhage, which seemed to come entirely from the left side and near the posterior nares, probably from one of the posterior palatine or sphenopalatine vessels. I immediately packed the nose over a rubber finger cot after the method of Casselberry of Chicago. The patient was put to bed in the sitting position and ice cloths applied to the head and neck. For a time the hemorrhage was much less severe.

At the expiration of an hour there was little bleeding anteriorly. But the patient was beginning to cough up large amounts of clotted blood. On examining his throat, I could see a little stream of blood

trickling down from his nasopharynx. The vascular tension still appeared to be extremely high.

More morphin and nitroglycerin were given the patient and the packing removed. Again there was a gush of arterial blood. A packing of bismuth subnitrate gauze was inserted, but the bleeding still continued. Then ferropyrin was tried, but this proved of little use. A few hours later a tampon of cotton was inserted into the nasopharynx but this also did not stop the bleeding. The unusual phenomenon of the retrograde passage of blood through the nasal duct, was noted. The patient was literally bleeding from his left eye.

During these seven hours the patient had lost at least two quarts of blood, but even with that amount of fluid withdrawn from the system, his vascular tension was still high. His general physical condition was very good. However, his nerve was almost gone. So I insisted upon his removal to the New York Eye and Ear Infirmary as expeditiously as possible. I feared that if collapse set in it might be necessary at a moment's notice to ligate the external carotid artery.

On his arrival at the hospital he was almost immediately taken to the operating room, the anterior packing removed and a fresh one of iodoform gauze inserted. The hemorrhage was not quite so profuse, but still bad enough. A large tampon was made of sterile gauze and with much difficulty and after retraction of the soft palate, inserted into the nasopharynx. More morphin was given and the patient put to bed. This completely stopped the hemorrhage on the left side, after twelve hours' continuous and profuse bleeding. About two hours later a spurting hemorrhage occurred from the right (the opposite) nostril. No bleeding point could be seen in the anterior nares. A fresh and larger packing was inserted in this side, the packing on the left side remaining. The patient was constantly retching and gagging and expelling clots of blood from his nasopharynx. And during one of these throat spasms he managed to free the tampon from the postnasal space. Thinking that perhaps the constant retching was keeping him excited, I allowed this space to remain open, and, much to my relief, no further hemorrhage took place.

As far as I could estimate, his blood pressure must have been

about 230. On the following day he was given three grains of sodium nitrite every four hours and an eighth of a grain of morphin every four hours. And that night a calomel purge was administered. The fluids were restricted and the amount of urine passed carefully recorded.

Axillary temperature was taken at first as the patient would not allow a rectal thermometer to be used. The temperature on the first day was 99.2 deg. F., was normal on the second day, and rose to 103 deg. F. on the third day. For three days the temperature was remittent, on the fifth day going to 104.8 deg. F. The blood pressure was carefully recorded, going from 230 mm. of mercury down to 170 mm. On this fifth day the patient began to complain of pain in his right ear. There was quite a little tenderness over the tip of the mastoid, and examination of the drum showed considerable bulging as if from a mass of blood in the middle ear. As the pain increased on the following day and the temperature again rose to 104 deg. F. a paracentesis was performed, allowing the discharge of a considerable amount of clotted blood. The patient was greatly relieved, the temperature subsided and the mastoid tenderness disappeared. Irrigations of the ear every three hours were continued for several days. The discharge finally became mucopurulent. The organism causing the discharge was a pneumococcus.

On the seventh day, early in the morning, bleeding again started on the left side. This continued for two hours when I again packed the nares anteriorly with pieces of plain sterile gauze. A few hours later these were removed and new ones inserted which were allowed to remain in place twenty-four hours. The blood pressure had again risen to 230 mm. I afterward discovered that he had been restless all night and had been easily disturbed by seeming trifles. Morphin and nitroglycerin were again given and on the following day all hemorrhage ceased.

The patient was discharged from the hospital on the tenth day. The right ear was still discharging profusely and there was no hearing in this ear. The following day acute pain in the left ear developed, and a perforation occurred a few hours later. He lost his hearing in this ear also. He received daily treatments for his ears until he could hear ordinary conversation fairly well, although hearing to the watch is zero in the left ear, on contact in the right. His blood pres-

sure was regulated and he was kept away from alcohol and tobacco since the onset of the epistaxis. The patient died this spring from apoplexy.

One should realize in a case such as this that we have a pathological condition in the nose which is merely a local manifestation of a general disease. Moreover the hemorrhage in such instances does not come from a capillary or vein but from a small arteriole whose walls are thickened and often infiltrated with lime deposits. The ruptured vessel is not given a chance to heal even if there are no indications in the blood itself which point toward a retardation of coagulation. The constant pressure of the blood in these overdistended arteries continually pushes out any clot which tends to form and even direct pressure with packing is not sufficient to ease the flow. Until one reorganizes the entire system and lowers the circulatory pressure, the hemorrhage will not cease.

I firmly believe that a prolonged epistaxis is often a premonitory symptom of some serious internal derangement even where no general evidences of disease are present. Blood pressure machines are often misleading in these cases and the trained finger gives a better indication of what is going on. Eliminating all local causes, one *must* find some general cause for a prolonged, severe hemorrhage. The nasal hemorrhage is Nature's timely warning and often these patients must be carefully watched for other manifestations. That this is so is indicated in the following case:

Dr. W., 45 years old, was seized with a severe epistaxis on the evening of November 21, 1913, which he was able to check for the time being. The following day there was no bleeding until the evening. Examination of the nose at this time showed a number of varicose veins on the septum in the midst of which was a bleeding vessel. The nostril (the right) was packed anteriorly with pledgets of cotton soaked in adrenalin and cocain. The hemorrhage was arrested for a time but started in again a few hours later.

The patient's blood-pressure at no time was over 140 mm. Hg., except on one occasion when it rose to 180 mm. Hg. after cocain and adrenalin was used. There was never any albumin or sugar in the urine although the patient reported that at times there had been a trace of sugar. Physical examination was negative except for a reduplicated second pulmonic sound.

An attempt was made at first to cauterize the local bleeding area with pure nitric acid, later with perchloride of iron. Only anterior packings were used and on the fourth day all bleeding ceased from the anterior vessel. It was only a short time before another severe hemorrhage began from some vessel located on the floor of the nose behind a spur on the septum. Anterior packings were of little use and on the seventh day a posterior plug of bismuth subnitrate gauze was inserted into the posterior nares on the right side. An anterior plug was also used. Ten c.c. of horse serum were injected, and the dose repeated twice at intervals of twelve hours, 30 c.c. being used in all. The coagulation time of the blood never seemed retarded, and it is questionable whether this had any direct effect on the cessation of the hemorrhage. On the evening of the eighth day after I first saw him, it was necessary for me to change the anterior packing almost every hour. The patient had been kept fairly quiet under the liberal administration of morphin. Other general measures seemed to have little effect.

On the ninth day, fresh blood was again seen oozing through the packing. I felt that the constant pressure of the packing was keeping up the bleeding and determined to remove it. No more bleeding took place with the packing out than with it in. During the manipulation of a firm clot on the floor of the nose, another profuse hemorrhage began. The nose was again packed by a rosette plug posteriorly and by this means the hemorrhage was controlled for forty-eight hours, when bright red blood was again seen. The packing was once more removed when, much to my surprise and satisfaction, no more bleeding occurred.

During this twelve day hemorrhage, the patient was considerably weakened. He had lost large quantities of blood. I feel convinced that if I had acted on his suggestion and performed a phlebotomy in the beginning he would have been much better off. However, blood-letting is a doubtful procedure except in those cases in which definite signs of increased arterial tension exist. During the later stages of his illness, the patient ran a temperature up to 101 deg. F., but no complications ensued and he has now entirely recovered.

A prolonged hemorrhage such as this is presumptive evidence of some general derangement of the system, call it what we may. Systemic disease manifests itself in various ways and it is often beyond

human comprehension to arrive at a definite conclusion *as to* causative factors. The spurting hemorrhage which was *manifest after* the first bleeding had ceased, indicates that there *was* an increase in arterial tension in this individual even though the sphygmomanometer failed to reveal this fact according to our usual comparisons.

Epistaxis *is* often an expression of systemic disease. This fact should be kept in mind in all cases and the services of a competent internist under such circumstances will often bring about a solution of the problem, perhaps not immediately at the time of the hemorrhage, but later on when Nature asserts herself by presenting more definite symptoms.

TUBERCULOSIS OF THE CECUM

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The portal of infection in producing intestinal tuberculosis has not yet been definitely established. No less an authority than v. Behring is of the opinion that intestinal tuberculosis is the primary condition and pulmonary tuberculosis the secondary one. Koch entirely discredits the existence of a primary intestinal tuberculosis. Wagener, on the other hand, has reported 20 such cases collected from 410 necropsies. Most authorities, however, believe that intestinal tuberculosis may exceptionally be primary, but in the great majority of cases it is secondary. This is proved experimentally by the fact that millions of tubercle bacilli are essential to produce intestinal tuberculosis in animals, demonstrating the correctness of the aerogenous theory.

When it is considered that animals fed on food containing tubercle bacilli show the latter in the stools, it seems very plausible that a primary tuberculous lesion may be set up in the intestine, especially if the protective power of the gastrointestinal juices is lowered or the mucous membrane is the seat of an ulcer or abrasion. Furthermore, the throat, genitals and skin may primarily be involved. Why, then,

should the intestines have any absolute immunity against tuberculosis? That the bowel is frequently the portal of tuberculous infection in childhood has been demonstrated by Heller and corroborated by others, though not in as high a percentage. Fischer, too, confirms this, but has found tuberculosis of the bronchial glands a much more frequent lesion than intestinal tuberculosis, proving to his satisfaction that the tubercle bacillus enters the body of children most usually by aerogenous route, rather than by way of the intestines.

In adults, however, bronchial gland tuberculosis, especially calcification, is by far the most frequently encountered tuberculous lesion. But calcification of the mesenteric glands, indicative of a previously existing tuberculosis, is only rarely found, in fact in about the same percentage as intestinal tuberculosis in childhood. This may point to a residual tuberculous glandular condition following intestinal tuberculosis during childhood.

Another theory as to the relationship intestinal tuberculosis bears to tuberculosis of the rest of the organism is entertained by Walsh and Rosenberger. They are of the opinion that the intestinal canal is the means through which tubercle bacilli reinfect the tissues. This is evidenced by intestinal ulceration and mesenteric gland enlargement.

That intestinal tuberculosis occurs much more frequently than suspected is shown by postmortem examination. Eisenhardt in 1000 autopsies on adults, who died of tuberculosis, found that some part of the intestine was involved in 56 per cent. of the cases. Hemmeter found secondary tuberculous disease of the intestine in 100 per cent. of the 56 autopsies performed, the lesion varying from a simple ulcer to a well-developed tuberculous condition.

The ileocecal angle is by far the most frequently involved of all portions of the intestine, that is, 75 to 85 per cent. of all the cases of intestinal tuberculosis are limited to this region.

The age at which the disease usually makes its appearance is between the twentieth and fortieth year of life, both sexes being affected in about the same proportion.

The bacillus tuberculosis is only demonstrable in about 50 per cent. of the cases, either by microscopical examination of the submucosa, or by positive inoculation of guinea-pigs.

Pathology. Tuberculosis of the cecum may be divided into two

pathological types: (1) an enteroperitoneal, (2) an hyperplastic form. The first type is usually secondary in character, often being due to swallowed tuberculous sputum. The lesion involves the mucous membrane of the cecum, or of the adjacent ileum, or both. The process starts with the formation of miliary tubercles which coalesce, undergoing caseation and necrosis, resulting in an ulcer. This ulceration is the commonest lesion found. It is irregularly oval, usually runs in a direction transversely to the long axis of the intestine unless a Peyer's patch is involved. Its edges are indurated and elevated. The whole thickness of the intestinal wall may be affected with the resulting adhesive peritonitis. Perforation may occur, though it is rather infrequent. The mesenteric glands may show distinct tuberculous changes or merely a round-cell infiltration. The ileum and cecum become adherent to the surrounding structures, abscesses form and fistulæ develop with openings either externally in the iliac, umbilical or lumbar region, or into the abdominal cavity itself, or organs situated in the vicinity of the cecum. The lumen of the cecum is not very much encroached upon in this type of tuberculosis.

The second or hypertrophic type of cecal tuberculosis is of rather infrequent occurrence, less than 300 cases having been reported. It is considered of primary origin and due to swallowing of tubercle bacilli with the food. Pulmonary tuberculosis, when associated with this type, is very insignificant, and advanced tuberculosis is rarely encountered. The lesion usually starts in the lymph structures of the submucosa or in the cellulo-fibrous subperitoneal layer. The characteristic feature is the reactive sclerous inflammation which tends to limit the process to the cecum and at the same time produces an enormous thickening of the organ involved. All or part of the cecum may be included in the tuberculous process. One specimen showed the disease limited to a small part of the ileocecal valve. This type is of slow progress, but when it spreads it does so toward the colon rather than toward the ileum, as in the other type of cecal tuberculosis. The cecum externally is irregularly nodular, at first movable, but later immovable, even the pericecal fat undergoing a fibrous change. The involvement of the mesocolon produces a retraction and upward displacement of the cecum, thus altering the direction of entrance of the ileum into the cecum. Viewed from within the cecum shows a narrowing of its lumen of varying degree. The

mucous membrane is thickened, but rarely the seat of an ulcer except in the later stages, when sloughing occurs, owing to areas of necrosis in the submucosa. It may be the site of villous vegetations or polypi. Microscopically the mucous membrane appears markedly thickened and the glands hypertrophied. The submucosa and subperitoneal layers show the characteristic tubercles and giant cells. The small embryonal cells indicate the reactive process and the muscular layer is the seat of round-cell infiltration. The small intestine gives evidence of catarrhal inflammation, producing an excessive exudate, and the ileum may undergo hypertrophic changes if the ileocecal valve is stenotic. The appendix becomes secondarily thickened, but usually remains patulous. The mesenteric glands are involved. In the late stage caseation with abscess and fistula formation replace the sclerous process.

Symptomatology. The onset of both varieties of cecal tuberculosis is very gradual. The early symptoms are slight pain in the lower abdomen and an irregularity in the bowel function. Some cases have diarrhea, others continuous constipation or the diarrhea may alternate with constipation. The diarrhea, according to Obrastzoff, may be an indication of involvement of the small intestine with a catarrhal and not necessarily a tuberculous condition. The pain at first of a dull type or a sensation of weight, later becomes more severe and localized in the right iliac fossa. Nausea and vomiting are sometimes complained of and loss of flesh may occur early in the disease. Evening rise of temperature has been noted, but some observers claim that it is due to the primary tuberculous lesion in the lung and do not find any temperature in the cases of primary cecal tuberculosis. As soon as the hypertrophy of the cecum produces partial obstruction, the patient complains of paroxysms of colic situated in the right iliac fossa, radiating to the hypogastric, epigastric and umbilical regions, or down the right thigh. These paroxysms occur without any apparent cause. In most cases the intake of food does not give rise to these colics, which may last from hours to days. They are often preceded by constipation. The intensity of the pain and the frequency of recurrence vary considerably. The interval may be absolutely free from pain or associated with tenderness of the organ and its immediate surroundings. These paroxysms of colic are usually followed by diarrhea, owing to the irritation of the mucous membrane

by the fecal stasis. Some cases, however, have diarrhea synchronously with the colic.

As the obstruction increases all these symptoms become more marked. Abdominal distension and visible peristalsis become apparent. Palpation of the right iliac fossa will at this time elicit tenderness, rigidity and a tumefaction. The intestine should be thoroughly emptied before the examination, at which time the cecum is held down in the right iliac fossa with the left hand, while the right hand palpates the tumefaction. In determining the seat of the lesion as being in the cecum, palpation of the ileum is very important. Normally the lower edge of the cecum is one centimeter above the inter-spinous line. In tuberculosis, owing to sclerotic changes and contractures, the lower edge of the cecum rises 3 to 4 centimeters. The ileum can then be palpated as a cylinder running for about 8 to 10 centimeters in almost a vertical line. In the presence of ileocecal stenosis, the ileum becomes hypertrophied, lies nearer the anterior abdominal wall and thus permits of peristalsis being observed. Exceptionally the cecum may lie 3 to 4 cm. below this line, in which case the ileum can only be palpated for a very short distance and runs more nearly horizontal. The mass varies in size depending on the extent of involvement of the surrounding tissues. Its shape may be round, oval or elongated if the ascending colon is included in the pathological process. The cecum usually maintains its form and outlines, though enlarged generally. The greatest infiltration is felt at the lower pole, gradually diminishing toward the ascending colon, which is palpable as a distended tube.

The surface is usually irregular and firm, adherent in the entero-peritoneal type, but movable in the hypertrophic form; in fact the cecum remains movable as long as the peritoneum is not involved. Ballotement is sometimes obtainable. The tumor rarely reaches Poupart's ligament, internally it may extend to the external border of the rectus and externally to about two fingers breadth from the iliac crest. Percussion elicits various data, depending on the thickness of the wall of the cecum, its contents, its nearness to the abdominal wall, and the presence of loops of small intestine anterior to it. Ordinarily a dull note is heard at the center of the tumor becoming tympanitic toward the periphery. By rectal and vaginal

examination the cecal tumor or enlarged mesenteric glands may be palpated.

Indicanuria is often present and the Diazo reaction is positive in a majority of the cases. Complete intestinal obstruction rarely occurs. Hydronephrosis from pressure on the ureter has been reported.

The last stage of the disease is characterized by abscess formation. It is usually of the chronic type and not often associated with temperature elevation. Fistulæ communicating with the abscess supervene most frequently in the right iliac fossa, but sometimes in the lumbar or umbilical region, or near the anus. Occasionally the abscess is of the acute type simulating an abscess of appendiceal origin. Bacteriological examination of the pus may demonstrate the presence of tubercle bacilli together with the pyogenic bacteria.

In some cases an acute perforation occurs before any preliminary tumor has formed. This may result in acute general peritonitis or a local abscess which may terminate in the formation of a fistula.

The lymph nodes in the right iliac region may be sufficiently enlarged to be palpable.

The examination of the feces may not show any gross abnormality except the presence of a large amount of mucus. This is not infrequently indicative of involvement of the ascending colon. In many cases, and especially in the later stages, blood in the fresh state or more frequently dark or disintegrated, occasionally pus and membranes, are encountered. The frequency and ease of finding tubercle bacilli in the stools vary according to the statistics of different authors. According to Hemmeter they are very difficult to find in old cases. Obrastzoff, in 5 cases, not only got positive results, but was successful after a very short search in almost every specimen. The bacilli in his cases were quite numerous. As microscopic examination of the diseased tissue has only shown tubercle bacilli in 50 per cent. of the cases, we can hardly hope to obtain a positive bacillary finding in every stool examination. The mucopurulent masses in the stools are the most liable to contain the bacilli, but they may also be found when the excrements are well formed. The occurrence of tubercle bacilli in the stool does by no means imply the existence of a tuberculous lesion of the intestine. German observers place very little significance in finding tubercle

bacilli in the feces as pointing to a tuberculous enteritis. Tubercle bacilli may be found in the stools of many patients with pulmonary tuberculosis. Furthermore, tubercle bacilli have been demonstrated in the feces of individuals who were not suspected of having had tuberculosis in any part of their body. Only a few of these showed involvement of the peritoneum or intestinal mucosa at autopsy, but all gave evidence of tuberculosis in some portion of the organism. In many, the lymphatic glands alone were infected. Obrastzoff considers the presence of tubercle bacilli in the stools together with the finding of an indurated cecum, comparable to detecting tubercle bacilli in the sputum in a patient having bronchial breathing and impaired resonance at the apex of the lung. According to the same author, every case of an infiltrated cecum had tubercle bacilli in the feces, which, however, contradicts our personal experience.

Out of 100 cases of intestinal tuberculosis that came to autopsy, Walsh found among the cases showing tuberculous ulceration of the cecum alone, that in one case tenderness and rigidity were elicited, in one tenderness alone, in 2 rigidity alone, and 2 complained of no symptoms at all. All other possible combinations of the usual symptoms, pain, diarrhea, tenderness and rigidity, that is, diarrhea, pain and tenderness; diarrhea, pain and rigidity; diarrhea, tenderness and rigidity; diarrhea and pain; diarrhea and tenderness; diarrhea and rigidity; pain and tenderness; pain and rigidity; diarrhea alone; pain alone, had not been noted in any of the other cases of cecal tuberculosis.

DIAGNOSTIC PITFALLS IN PEDIATRICS. MILIARY TUBERCULOSIS. ACUTE INTUSSUSCEPTION.
PYLORUS STENOSIS

By HERMAN B. SHEFFIELD

New York

MILIARY TUBERCULOSIS

From time immemorial "worms" like "teething" have been looked upon as the source of all human ills. Even in this enlightened era of scientific medicine we occasionally come across grave constitu-

tional affections which are attributed to intestinal round worms not only by the laity but by physicians as well. A few months ago I have had an opportunity to see a case in point. It concerned an Italian girl, ten years old, one of five children of apparently healthy parents. She arrived in this country about three months before from a small Italian town. She had been ill since then, complaining of headache, nausea, apathy, general debility and occasional vomiting. At first her trouble was attributed to seasickness or its effects, but when one day she happened to pass several large round worms, the diagnosis was promptly changed, and there was great rejoicing in the family. The grandmother of the child was particularly happy and proud of her diagnostic skill, she having been the first to insist upon worms as the cause of the child's trouble. After trying several home remedies without obtaining any particularly beneficial results, an Italian physician was consulted, and he promptly corroborated the diagnosis, suggesting, however, that malaria might possibly also be responsible for her great pallor and emaciation, and hence prescribed large doses of quinine in addition to a powerful anthelmintic. The medicine, to be sure, had the desired effect—but only in one direction. The worms were expelled but the child's condition rapidly grew worse from day to day. An American physician was soon consulted and judging by the meteorism, evening rise in temperature, and a history of a few weeks' illness, decided he was confronted by a severe case of typhoid fever. The diagnosis was quite rational under the circumstances; the doctor had failed, however, to test the blood for Widal's reaction which soon proved negative; nor did he attempt to examine any other organ of the body, with the object in view of detecting a lesion elsewhere. For, when three days later she was removed to the hospital, I found the following symptom-complex: The child was greatly emaciated, mere skin and bone. She was in deep stupor most of the time and when aroused was barely able to utter simple syllables, like yes or no. Her legs were strongly flexed upon the abdomen and her head was slightly retracted. Babinski's sign was very pronounced, especially on the right side. Kernig's sign was present on both sides. Her respiration was very rapid and she coughed quite frequently. Careful examination of the lungs revealed a diffuse broncho-pneumonia with several spots apparently in a state of resolution. The heart was

normal except for the galloping rhythm, the pulse ranging between 160 and 180 per minute. The liver and spleen were both considerably enlarged and the abdomen was greatly distended and very painful to the touch. Here and there nodular enlargement could be elicited under the palpating fingers. The urine was loaded with albumin and microscopically revealed casts and blood. The child's bowels moved frequently, the stools being grayish and thin and filled with mucus. I withdrew 20 c.c. of cerebrospinal fluid by lumbar puncture and employed the v. Pirquet test. The former proved positive while the latter negative, but a microscopic examination of the sputum showed tuberculous involvement of the lungs. With these data in possession, there was no difficulty to arrive at a correct diagnosis. We were plainly dealing with a case of miliary tuberculosis, probably beginning in the lungs. The diagnosis of malaria or typhoid were somewhat justified in the early stages of the disease, but in malarial remittent or intermittent fever the blood invariably shows the presence of the plasmodium of Laveran, while in typhoid the Widal and diazo reactions are positive. Moreover in neither of these conditions is the tubercle bacillus found in the sputum.

ACUTE INTUSSUSCEPTION

Intussusception is an affection peculiar to infancy, the comparatively greater length of the intestinal tract and the debility of its musculature serving as potent predisposing causes. The exciting causes are still obscure, but there is just reason for the belief that active catharsis for the relief of habitual constipation or excessive diarrhea with marked tenesmus form frequent etiologic factors. I believe, however, that some intestinal malformations, e.g. congenital or acquired dilatation of the colon, which is by far more common in infancy than is generally supposed, play a very important rôle as remote causes. As is usual in acute intussusception, the five-months-old infant under my observation was suddenly seized with pain and vomiting, became very restless and refused to take the breast on which she had been nursed from birth on. As the mother of the baby had at the time been greatly worried over the fate of her husband, who was undergoing an operation for strangulated hernia, she attributed the unexpected illness of her child to some "nervous" disturbance of her breast milk. Moreover, on a few oc-

casions the baby had also received a bottle or two of diluted cows' milk, which she thought might have upset her stomach. In addition to this the baby three days before rolled out of its go-cart, head downwards, although apparently without any noticeable bad after-effects. A physician was sent for the same day, and finding the baby suffering from colic, diarrhea and vomiting, ordered a teaspoonful of castor oil, and a rectal irrigation, to be followed a few hours' later by small doses of salol and bismuth. The next day the stools assumed a bloody consistency, and presuming that dysentery was dealt with he added a few doses of Dover's powder. The opium seemed to relieve the colic, but the bloody stools continued. Alarmed over this condition the family physician kindly invited me to see the case with him. This was about three days after the onset of the vomiting. The patient was drowsy, and its facial features were greatly depressed. Her temperature was 100 deg. F., the pulse slow and feeble, and she seemed entirely free from pain. Her abdomen was slightly distended but on palpation I readily detected an oval-shaped doughy mass in the left iliac region which was very sensitive to pressure. Furthermore, on introducing the finger into the rectum, about two ounces of bloody fluid was forcibly expelled from the rectum along the sides of the examining finger. There could be no doubt as to the diagnosis. The sudden onset, the persistent vomiting (which by the way was not feculent!), the bloody discharge free from feces, the intense colic and above all, the painful mass in the left iliac region, were pathognomonic of intussusception. Dysentery was a plausible diagnosis the first day, but surely not thereafter, when free blood made its appearance. In some cases intussusception may be mistaken for incipient appendicitis, impaction, peritonitis or strangulation, but in none of these cases would we find sero-sanguinolent and later purely bloody stools. Besides, these diseases have pathognomonic symptoms of their own, which must always be considered in the differential diagnosis. I suggested an immediate operation, and Dr. Lilienthal performed the same within an hour. The laparotomy revealed a colonic invagination at the sigmoid flexure, embracing the entire colon including the cecum. The baby succumbed a few hours later. While firmly believing in an immediate operation, I am nevertheless in a quandary, whether or not it would have been more judicious to leave a case of this kind of three days'

duration alone. Cases are on record where sloughing of the invaginated portion of the intestine and its discharge has taken place with apparent recovery of the patient.

PYLORUS STENOSIS

The baby under consideration was seven weeks old when he came under my care. The family history presented nothing remarkable except that the mother when five months pregnant received several external bodily injuries by being struck by an automobile. She suffered from pain and shock for a few days, but recovered soon without apparent serious consequences. The baby was born at full term and weighed nearly eight pounds. The first two weeks he seemed to do quite well, nursed lustily on the mother's breast, had from eight to ten thin yellow movements a day and gained in weight. About a week later it was noticed that the baby occasionally spit up an unusually large quantity of milk, became very restless, slept but little, cried a lot and lost perceptibly in weight. Anti-colic home-remedies, from catnip and fennel tea down to gin and paregoric were employed galore, but without the slightest benefit. One physician thought the child was crying because the mother's milk was too rich, another one declared her milk too poor—the poor baby, he thought, was starved, and hence dissatisfied with its lot. One suggested barley water with milk, another one barley water without milk—in short the child got worse from day to day and when brought to my office weighed barely five pounds. The baby was pale and puny, its face was drawn denoting great suffering, the skin, especially over the extremities was hanging loosely in large folds, the epigastrium was distended while the lower portions of the abdomen were flat and tense. It was forever crying, tossing from side to side and arching its body forward, begging, as it were to be picked up, to be relieved of its agony. It had nursed an hour before, slept about fifteen minutes, awoke crying from pain and had been very ill at ease. He seemed extremely hungry. I suggested to put him on the breast. He anxiously grasped the nipple, and voraciously swallowed a few mouthfuls of milk, but being seized by intense pain, dropped the nipple, and went through the same performances as before. As it lay on the table, I noted that his stomach projected strongly forward and upward, permitting easy tracing of all its ana-

tomic outlines, and on further inspection the stomach was seen for several minutes to undergo slow wave-like contractions from right to left, ending up with an explosive ejection of a large quantity of partly digested milk, the quantity by far exceeding that consumed at the last feeding. The vomiting over with, the baby obtained instant relief. This retention of digested food in large quantities (ischochymia); the visible reversed peristaltic movements of the stomach (hyperkinesis), and the pseudo-constipation, or occasional evacuation of small quantities of brown, foul-smelling fluid, at once direct our attention to some obstruction of the pylorus. However, in the absence of tumefaction at the site of the pylorus, it is impossible to decide, whether the obstruction was organic or spasmodic in character. Notwithstanding the recent improvements in the methods of diagnosis, such as the X-ray-bismuth-test and the duodenal bucket, it is still impossible definitely to differentiate a mild case of true congenital pyloric stenosis from a severe case of the spasmodic variety. The history of this case, i.e. the fact that the baby did well for the first four weeks, surely pointed to its being spasmodic in character. Yet, when ten days later, after trying the usual methods of treatment without avail, the baby was operated upon by Dr. Lilienthal, it was found that the pylorus was cartilaginous and thick, the size of an index finger, and barely permeable by a minute probe. Except for a slight rise in temperature, the baby did exceedingly well for four days. It partook of peptonized milk and had a few well-formed movements daily. On the fifth day the temperature rose to 104 deg. F. and the baby died the same day from some unforeseen septic infection apparently contracted after the operation.

HYPERTHYROIDISM,—ITS ETIOLOGY AND SYMPTOMATOLOGY

By WILLIAM HARMAR GOOD

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Hyperthyroidism is peculiarly a condition of the female during the period of greatest reproductive activity, i.e. from the fifteenth to the thirtieth years. If we examine carefully the history of cases

occurring later in life, we will usually find unmistakable evidence of earlier mild hyperthyroidism. We have simply had an acute exacerbation. Its counterpart, hypothyroidism, is found in the female during the decline of reproductive activity, the average age, according to Osler, is 38 years; seventy per cent. occurring between the ages of 30 and 55 (Murray).

Normally during the active reproductive age, there seems to be, especially in the female, a great increase in thyroid activity. Under unusual stress, especially nervous stress, this activity becomes excessive and symptoms of hyperthyroidism develop. As I see it, *hyperthyroidism is a normal physiological phenomenon pathologically exaggerated.*

At one time, I thought every case of exophthalmic goiter showed a goiter and exophthalmos, but in fact the exophthalmos is very often absent, and the goiter not infrequently so. Since my attention was sharply drawn to this condition several years ago many cases that I was unable to diagnose satisfactorily have become plain.

Noticing the frequency of the condition I took last July 100 consecutive office cases of females over 10 years of age. I found 14 had hyperthyroidism, in 7 of which it was so readily demonstrable that even the most superficial examination revealed the true state of affairs.

Besides the influence of sex and reproductive activity, there are a number of other etiological factors, more especially direct heredity and a neuropathic hereditary predisposition, as hysteria, alcoholism, epilepsy and insanity. Overwork, acute infection, pregnancy and great emotional disturbances often are the immediate exciting causes. The symptoms of hyperthyroidism often disappear with astonishing rapidity after labor. Some of the patients are indeed greatly benefited by having a child.

As to the symptoms in detail, a thyroid gland may be overactive and yet not enlarged; for this reason, goiters are not constantly found, possibly in about 90 per cent. of the cases. The exophthalmos is found usually rather late, occurring in about 75 per cent. of well developed cases. There are several other ocular symptoms: the deficiency of power of continued convergence (Möbius), the slow incomplete following of the upper lid when the eyes are directed downward (von Graefe) and various extrinsic muscular pal-

sies. The question as to whether or not hyperthyroidism is frequently a cause of external strabismus is of interest.

The tachycardia is quite a constant symptom, but varies greatly, the least excitement often bringing on troublesome palpitation. The heart often hypertrophies and later myocardial degenerative changes may take place and be the actual cause of death.

The blood pressure does not vary much beyond the normal limits, the highest I have seen was 165 and the lowest 105. Both of these had a goiter, exophthalmos, tachycardia, palpitation, tremor, and marked emotional instability. Usually, I found the highest pressures in those with the greater tachycardia. The patient with the pressure of 165 showed a peculiar rhythmical change of pressure of about 10 m.m. Hg. three or four times a minute, typical Traube-Hering curves.

As to the gastrointestinal symptoms, we often find nervous indigestion and at times troublesome vomiting. Seldom are the patients constipated, but often they complain of looseness of the bowels, more especially around the menstrual period. I remember one girl especially who regularly for ten days before the menstrual flow would have a severe diarrhea that was very refractory to all the usual treatment.

Of the nervous symptoms, the more prominent are the tremor, the great emotional instability, loss of memory, inability to concentrate and the general irritability. These symptoms are usually very constant and often are the ones for which the patients seek relief. Rapid breathing of nervous origin or actual dyspnea is not infrequently a symptom. The sufferers from hyperthyroidism often lose weight rapidly, the emaciation in severe cases being frequently marked. The temperature is usually normal, but we may find not infrequently more or less prolonged periods of fever.

Another symptom and one to which I especially wish to call your attention is the excessive menstrual flow. Usually on questioning, they will say it is normal, but on further questioning you will usually find it is prolonged to five or even to ten days and abnormally free. In fully 85 per cent. of my observations have I found this excessive flow, this menorrhagia. It is usually not painful. Often the menorrhagia is blamed on venereal excesses, when the excesses and menorrhagia are both but symptoms of a hyperthyroidism. From a rather

limited number of observations, hyperthyroidism seems to be a decided factor in the causation of some abortions.

Among other symptoms may be mentioned excessive sweating, troublesome blushing, glycosuria, polyuria, headache, mental depression and delusions, skin pigmentations, urticaria and loss of hair. Some of these are possibly due to some associated glandular disease, as the pigmentation with the adrenals and the polyuria with the pituitary.

We all can recall the large open-eyed emotional young woman who comes in with a history of palpitation, tremor, nervous indigestion, very free menstrual flow, with a tendency to loose bowels. Probably she has lost some in weight, and complains that she cannot do her customary work as well as aforetime, is forgetful, irritable, goes up in the air readily. That girl has an overactive thyroid.

General Retrospect

MYOCARDITIS, AND SOME OF THE DISTURBANCES OF THE CARDIAC MECHANISM

(A REVIEW OF RECENT LITERATURE)

By L. BERTRAM SACHS

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II

PAROXYSMAL TACHYCARDIA

Paroxysmal tachycardia is an abnormal mechanism which consists of sudden accelerations of the heart rate in response to the awakening of new pathological impulses arising in a single focus in the heart wall. This focus is usually in the auricle, but it may be in the ventricle. Paroxysmal tachycardia occurs in all ages, the highest incidence is between the thirtieth and sixtieth year. The disorder is more frequent in the male. Rheumatic fever is the only infection which is etiologically common. Most cases have no signs of valve lesions, and in a large number of the patients there is little or no evidence of dilatation during the intervals between the paroxysms; nevertheless mitral stenosis and myocardial degeneration are the most frequent associated conditions. In instances in which examination has been possible after death, the most prominent and frequent lesions have been in the walls of the heart.

A heart rate of 180 or more in an adult is usually the result of pathological impulse-formation, and especially is this the case where a heart lesion is known to be present. The rate of the ventricular beating is preserved when the patient passes from the upright to the recumbent posture. A physical sign of the utmost diagnostic importance may be noted at the onset or offset of an attack, the increase and decrease in rate at these times are absolutely abrupt. A prominent and palpable pulsation in the veins at the root of the neck is often present. In mitral stenosis in which the attacks are relatively common, the presystolic murmur is usually abolished during the attack.

The attacks may be momentarily, or last for weeks or months. In patients in whom the attacks are brief, they may ensue without the patient's knowledge. Paroxysms lasting for an hour or longer are almost invariably accompanied by obvious symptoms. Discom-

fort over the heart region, slight or violent palpitation, tremor or fluttering in the chest, and a beating in the neck are common symptoms. Lassitude, exhaustion, coldness, and sweating are early symptoms. Later flatulency, salivation, nausea, and vomiting are prominent. A symptom referable to the heart is pain, varying from a sense of compression with skin tenderness to violent and continuous ache. In a number of patients as the attack proceeds, the limit of cardiac dulness moves steadily away from the middle line, and as pallor becomes more marked, cyanosis and general venous engorgement ensue. The attack may terminate in progressive failure and death. The great majority of paroxysms cease with an abrupt resumption of the normal rhythm. Nothing is more remarkable than the rapidity with which the normal circulatory forces are restored.

As far as the differential diagnosis is concerned, it must be remembered that the stasis in the lungs with dulness and crepitations at the base have been attributed to pneumonia. Anginal pain, maximal in the abdomen, accompanied by abdominal rigidity, vomiting, and signs of collapse have been mistaken for the symptoms of a perforated gastric or duodenal ulcer. A large number of patients are grouped under the term "Heart strain." Acute cardiac dilatation has been diagnosed in a pregnant woman suffering in reality from a rheumatic heart with mitral stenosis.

The prognosis as a whole should be based on first and most important an estimate of the endurance of the cardiac muscle, and secondly upon the severity of the trials through which it passes. The attacks themselves are important indications of muscle damage, and they frequently place the life of the patient in jeopardy.

AURICULAR FIBRILLATION

Auricular fibrillation is a condition in which normal impulse-formation in the auricle is replaced by stimulus-production at multiple auricular foci, producing gross irregularity of the ventricular action. When the auricle is caused to pass into fibrillation or delirium during experimentation, the muscle walls are seen to be maintained in a position of diastole. But close observation of the muscle surface reveals the extreme and incessant activity, rapid and minute twitching movements are visible over the whole muscle, numerous and haphazard impulses escape to the ventricle, producing an increased and irregular action of that structure. Such are the events in experiment, and those of the clinical condition are identical with one proviso, namely in the human subject the conducting tissues may be either intact or damaged, consequently the ventricular rate varies widely in different patients. The usual rates lie between 90 and 140.

Auricular fibrillation is not found in the first decade of life. The observed age limits are 13 to 84 years. It is much more common in

men than in women. Where there is a rheumatic history, the sexes bear the burden more equally. Of etiological factors, rheumatism is predominant. Valve lesions are present in a number of cases. The most constant structural alteration found is a more or less intense grade of subacute or chronic inflammatory change in the heart musculature. The auricles are conspicuously affected.

The clinical recognition of auricular fibrillation rests primarily upon the nature of the ventricular action. When the ventricle beats irregularly at a rate surpassing 120 per minute, the irregularity is almost always of this nature. When an irregular ventricular action accompanies signs and symptoms of serious heart failure, it is probably the result of auricular fibrillation, and the probability is increased if the heart rate is much accelerated. In patients in whom the heart rate is irregular but not much accelerated, if the irregularity be due to fibrillation, it becomes more irregular on acceleration by exercise, while irregularities due to premature beats, partial heart block, etc., become less frequent on acceleration due to exercise. In most cases auricular fibrillation is continuous from the time of observation until death. The other irregularities are present from time to time so that there are intervals of regular ventricular action each hour or each day.

The symptoms are those of degenerate and failing heart muscle. The symptoms which appear to be the special developments of fibrillation itself are very variable.

The patients often experience occasional fluttering in the chest and neck, and may be conscious of irregular heart action. They are more prone to shortness and other symptoms of overtaxation of the heart, than are those with similar valve lesions and a like degree of cardiac dilatation. It cannot be stated that any symptom, such as cyanosis, conspicuous dyspnea, noticeable venous engorgement, or dropsy is the direct outcome of fibrillation. In all these cases chronic disease of the myocardium is the essential lesion.

A diagnosis of aortic regurgitation is never justifiable when the heart is grossly irregular and slow unless unequivocal signs of it are present apart from such a murmur.

Fibrillation gives an added significance to the case. In most cases it indicates cardiac failure, temporary or terminal, so that few patients survive its onset for more than ten years. A persistent rate of 120 or over is of serious omen.

ALTERNATION OF THE PULSE

(Pulsus alternans)

Alternation of the pulse is a condition in which the left ventricle while beating regularly, expels larger and smaller quantities of blood at alternate contractions.

The disturbance is dependent upon some unexplained anomaly of the ventricular systoles. Alternation is seen in two classes of patients. First it occurs in those patients in whom the heart rate is unduly accelerated, and more especially as an accompaniment of paroxysmal tachycardia. In such association, its etiological and pathological relations are the same. Its prognostic significance is not as yet fully understood, but it may be regarded almost as a physiological reaction to the increased frequency of the heart rate. Secondly, it occurs when the heart rate lies within normal limits, and at such time is a sign of much clinical value. When seen in elderly subjects, and preeminently in the male sex, it consorts especially with angina pectoris, high arterial pressure, renal disease, and fibrotic myocarditis.

It is an unfortunate fact that instances of *pulsus alternans* cannot be recognized by other than instrumental means. In some patients the alternate force of the pulse is perceptible to the finger, but such cases are rare. It is wise to examine all cases of angina pectoris, all cases of high blood pressure and all elderly subjects in whom affections of the heart are suspected, or renal disease is known to exist, to determine its absence or presence. Alternation of the pulse gives rise to no recognized symptoms.

Concerning the prognosis, great import must be attached to the presence of pulse alternation. It is the faint cry of a fast-failing heart muscle. Angina pectoris, nocturnal dyspnea, Cheyne-Stokes breathing, and high pressure are associated signs, but every one of these signs may be lacking and alternation may appear alone to foretell the future.

Progress of Diagnosis and Prognosis

GENERAL METHODS OF EXAMINATION—SYSTEMIC AFFECTIONS—DISORDERS OF GENERAL METABOLISM

Glucose in the Urine; the Reduction Methods for its Determination—
J. MEINERTZ, *Med. Klinik*, Vol. IX, Oct. 26, 1913.

In employing the various reduction methods for the quantitative determination of urinary glucose, the other reducing substances of the urine form the chief sources of error. The reducing substances in the urine may possess a reducing power corresponding to that of from 0.2 to 0.9 per cent. glucose. In case a urine contains a large amount of sugar this source of error is of very little consequence; however, the results obtained in concentrated urines with little glucose may be entirely inexact when the reduction methods are employed. None of the modifications of the old Fehling titration method does away with these sources of error. Bartrand's method, in which the separated cuprous oxid is determined, is the most reliable of the reduction tests. This method may still be improved by the addition of alcohol which eliminates the disturbing influence of the urinary reducing substances. MILL.

Calcium Content of Urine in Diagnosis—G. RODILLON, *Semaine Méd.*, Sept. 10, 1913.

Emphasizing the "demineralization of pre-tuberculosis," author has worked out a test for the detection of calcium salts in the urine. Calcium, on a vegetable diet, is eliminated by way of the intestinal canal, and on a meat diet by way of the kidneys. Before performing the test it is advisable to have the patient on a strict meat diet for two days. The apparatus consists of the following: a graduated glass cylinder, 10 cm. in height and 15 mm. in width, with a flat bottom; a white plate or card with a heavy black line across the center. The reagent is made up as follows: neutral ammonium oxalate 3.0 grams, acetic acid crystals 5.0 grams, water 40.0 c.c. The tube is filled to the 5 c.c. mark with the reagent, and an aqueous solution of calcium oxide (0.02 gram to the liter) added up to the 10 c.c. mark. The solutions are allowed to mix and the tube placed on the

card, so that the black line bisects the base of the cylinder. The fluid is then withdrawn, using an ordinary dropper, until, on looking into the tube, the black line becomes perceptible. The figure reached is the standard for comparison and is, usually, 2.4 c.c. The test is now repeated, using 5 c.c. of the reagent and 5 c.c. of urine. The height of the fluid, when the line becomes visible, gives the calcimetric index for that urine. Normally this is about 3.2. The following equation is then worked out; the base of this equation is 0.2 (calcium oxide), which is multiplied by 2.4 (the standard) and the result divided by the patient's index, viz: $0.2 \times 2.4 = 0.15$. This

3.2

represents the calcium content of one liter of the urine examined. In health, on a mixed diet, this may vary from 0.0-0.6, while on a vegetable diet, it may approximate 0.2. Over 0.9 speaks most positively for demineralization and the probability of the development of tuberculosis.

KAUFMAN.

Influence of Phenol upon the Wassermann Reaction—E. SIGNORELLI, *Zeitschr. f. Immunitätsforschung u. experimentelle Therapie*, Vol. XIX, No. 2.

The addition of a small amount of phenol may markedly increase the sensitiveness of the Wassermann reaction. Author dilutes the serum of the patient to ten times its volume by means of a sodium chlorid solution containing 0.25 per cent. phenol. It is an open question whether or not the increased sensitiveness of the reaction serves a good purpose or gives rise to non-specific inhibitions.

WESTERN.

Hypertension and Cholesterinemia—C. CANTIERI, *Wiener klin. Wochenschr.*, Oct. 16, 1913.

Determinations of the cholesterin content of normal human sera according to the method of Grigaut showed figures varying between 1.37 and 1.05 per mille. Sera of arteriosclerotic persons with and without hypertension have normal or increased amounts of cholesterin. No connection could be demonstrated between the cholesterin concentration and the degree of blood pressure. The same was the case with the cholesterin content of the sera of nephritic individuals. The latter exhibit generally hypercholesterinemia, but this is independent of the blood pressure degree.

MILL.

The Pulse during Sleep—F. KLEWITZ, *Deutsches Archiv f. klin. Medizin*, Vol. CXII, Nos. 1 and 2.

In 20 persons with healthy hearts the average pulse frequency

during sleep was 59.3 per minute, when awake it was 74.1; the average frequency decline was 19.9. The frequency fluctuations of the pulse are smaller during sleep than during waking hours. When an individual is at absolute rest, but not asleep, the same low pulse frequency as during sleep may occasionally be met with. In the sleep during the day the pulse frequency is not at all or but slightly diminished as compared with the pulse frequency when being awake. Hearts with compensated valvular disease are like normal hearts. In decompensated hearts there is mostly a slight diminution of pulse-frequency during sleep; this decline runs about parallel to the degree of decompensation. In very grave cases the pulse frequency may even be higher during sleep than when being awake. Irregularities of cardiac activity do not disappear while sleeping. In essentially nervous tachycardias pulse acceleration may disappear during sleep; this is not the case when the tachycardia is due to an organic change.

WESTERN.

Morbus Maculosus Werlhofii, Investigations concerning Blood Coagulation and Viscosity, and Blood Plaques—O. STEIGER, Wiener klin. Wochenschr., Oct. 23, 1913.

Results of the minute examinations of 3 cases of morbus maculosus Werlhofii (purpura hæmorrhagica). The blood coagulability, determined by means of the method of Morawitz, was decidedly diminished. The blood viscosity was found to be reduced, and the number of blood plates was strikingly low. Therapeutic endeavors as injections of saline solutions, serum, blood or pepton remained without influence upon the coagulation process. Extracts of blood plaques in the form of coagulins induced rapid cessation of the mucous membrane hemorrhages, especially the epistaxis. MILL.

Bence-Jones Proteinuria in Leukemia—T. R. BOGGS and C. G. GUTHRIE, Johns Hopkins Hospital Bull., Dec., 1913.

This is a report of four cases. Authors conclude that Bence-Jones proteinuria is not essentially dependent upon one disease, but is a manifestation of disturbances in the bone marrow affecting endogenous metabolism.

WESTERN.

Surgery of the Spleen—J. BLAND-SUTTON, Brit. Jour. Surg., Oct., 1913.

Removal of the spleen in patients with leukemia is the most fatal operation in surgery; death is due in most cases to uncontrollable bleeding or to shock. Splenectomy for wandering spleen is accom-

panied by the same risks that beset an uncomplicated ovariectomy. The removal of a malarial spleen is attended with great risk, especially so when the spleen lies in its normal position. The risks attending the removal of enlarged spleens in the category of splenomegaly associated with anemia are great; but the death rate varies with the skill and experience of the operator. It is encouraging to realize that when patients recover from splenectomy, there is nothing in their condition to suggest that they are spleenless.

SACHS.

The Nose in its Relation to certain Systemic Diseases—M. SENATOR, Wiener klin. Rundschau, 1913, No. 38.

The nose may be the portal of infection of tracheal tuberculosis and facial lupus. There exists a periodic mutual parallelism between coryza and nephritis and albuminuria. The same is the case with rhinitis in certain affections of metabolism. The nasal mucous membrane may lodge the nidus of infection in polyarthritis and chorea.

MILL.

Unusual Type of Acid Intoxication in Infants—I. A. ABT, Am. Jour. Med. Sci., Jan., 1914.

Histories of four cases of seemingly unusual types of acid intoxication. Author opines that these cases depend upon some derangement of the infantile metabolism, resulting in the production of toxic products from misdirected chemical processes.

WESTERN.

Anemic Dermography in Childhood—M. KARASAWA, Wiener med. Wochenschr., Nov. 3, 1913.

The anemic reaction was elicited by stroking the skin with a thin metal plate; at first the irritated area became red, but after from 10 to 60 seconds anemia, lasting from 3 to 6 minutes, ensued. Infants under 2 years of age never showed the reaction; this was even the case when they had measles or scarlet fever. In older children it occurred in about 5 per cent. of those examined; however, when diphtheria was present it supervened in 10 per cent., in measles in 83 per cent., and in scarlet fever in the first week in 83 per cent. of the cases.

MILL.

Heat and Infant Mortality—J. W. SCHERESCHEWSKY, Arch. Pediatrics, Dec., 1913.

The influence of heat as an immediate factor in the mortality of infants has been greatly underestimated in the last 25 years. The

lethal action of heat is a function, not so much of the maximum and mean temperatures of the external air as of the indoor temperatures, which, in the late summer, may continue to be high in spite of remissions in temperature of the external air. The action of dirty and stale milk in causing the death of infants has been given a significance which has overshadowed other factors of equal or greater importance. There is evidence to show that a certain proportion of infant deaths are due to specific infections, in the dissemination of which contact infection and flies doubtless play a part. WESTERN.

Dermatoses and Anacidity—W. LIER and O. PORGES, Wiener klin. Wochenschr., Nov. 27, 1913.

History of 4 cases in which very stubborn skin affections (urticaria, eczema and furunculosis, pruritus, neurodermitis chronica) could only be ameliorated by the administration of hydrochloric acid, after the examination of the gastric contents had demonstrated subacidity or anacidity. MILL.

Clinical Recognition of Latent Syphilis—W. W. GRAVES, Deutsche Zeitschr. f. Nervenheilkunde, Vol. II, No. 3, 1913.

There are subjective symptoms and physical signs in the latent period of syphilis. Among the subjective symptoms author enumerates recurrent constitutional manifestations of the syphilitic as the sense of illness, general bodily discomfort, pains, lassitude, gastric difficulties and vertigo. The syphilitic syndrome consists, according to author, of the cachectic pallor and the pigmentations. Vascular symptoms are the general hyperemia, the local vascular reactions, the great frequency of specific reactions in the aorta and pulmonary arteries, varicose ulcerations and affections of the vessels of the nervous system. The same symptoms are also met with in the offspring of syphilitics; hereditary disposition to arterial changes and juvenile arteriosclerosis are of syphilitic origin. Changes in the central nervous system as pupillary disturbances, alterations in sensibility and the reflexes also form a part of the syndrome of latent syphilis. WESTERN.

Amyloid Degeneration in Pulmonary Tuberculosis—I. HOLMGREN, Zeitschr. f. Tuberkulose, Vol. XXI, Nos. 1 and 2, 1913.

Amyloid degeneration and an alteration of the finger nails, designated as "Uhrglasnägel" (watch glass nails) by the author, are often associated. In 86 cases of amyloid degeneration nail changes

were noted in 72 per cent., in 41 cases of very pronounced amyloid degeneration such changes had ensued in 85 per cent. Of 49 cases with distinct nail changes 42 showed amyloid degeneration, of 70 cases without nail changes amyloid alteration was encountered in but 18. Symptoms of amyloid degeneration of the liver and the changes in the form of the finger nails may ensue at one and the same time. Venous sclerosis, a condition of frequent occurrence in pulmonary tuberculosis, is also very often associated with amyloid degeneration. In 70 per cent. of the cases of venous sclerosis amyloid degeneration had supervened; 70 per cent. of the very pronounced instances of amyloid degeneration and 54 per cent. of all the cases of amyloid disease exhibited venous sclerosis. In tuberculosis, therefore, the change in form of the finger nails and the venous sclerosis appear to be in some relationship to amyloid degeneration, and are hence of diagnostic import.

FRY.

Amino-Acids in the Urine of Diabetes Mellitus—P. J. CAMMIDGE, *Lancet*, Nov. 8, 1913.

The urine in simple cases of glycosuria shows no amino-acid nitrogen by the method employed by author excepting when there is evidence of a gouty condition, or a serious hepatic derangement. In such cases the urine may contain traces of aceton. When secondary disturbances of metabolism occur, and the patient has reached the third stage of diabetes, the amino-acid nitrogen is small in amount at first (0.05 gram), but as the disease progresses, it generally increases rapidly, often more rapidly than the aceton bodies until 2 grams or more are being excreted daily. Finally the amino-acids may be present in such abundance that the relatively insoluble tyrosin crystallizes out and can be recognized in the urinary sediment with the microscope. In some cases the excretion of the amino-acids and aceton bodies run parallel, but this is not always the case, a high amino-acid and a low aceton excretion may exist. In such instances the patients often die suddenly with symptoms of heart failure. The appearance of amino-acids in the urine in recognizable amounts is usually a sign that too much protein food is being taken.

SACHS.

Diabetes and Cirrhosis of the Liver—L. BOUCHUT and VOLMAT, *Revue de Médecine*, Vol. XXXIII, No. 10, 1913.

Description of 2 cases of hypertrophic cirrhosis of the liver combined with moderately severe diabetes. In the one case there were ascites and icterus; in the other pulmonary tuberculosis was pres-

ent. Both patients were alcoholics. The etiological connection between the cirrhosis and the diabetic manifestations is not definitely proved. Still there exists a clinical picture in which both conditions are combined. In cases of this sort the diabetes is generally mild and the intensity of the glycosuria frequently declines in the terminal stage of the affection.

ZIMMER.

Pre-Cancerous Diseases—D. v. HANSEMAN, *Zeitschr. f. Geburtshilfe u. Gynäkologie*, Vol. LXXIV, No. 1.

Most pre-cancerous diseases belong into the domain of the chronic inflammations, as for instance, eczematous dermatitis, xeroderma and Paget's disease, lupus, the chronic ulcers of the lower part of the leg and the stomach. Similar forms of inflammation leading to hyperplastic states and atypical epithelial proliferations have also been met with in the intestine. Among the pre-cancerous affections must also be counted the inflammatory forms of hyperplastic conditions like the polypi of the stomach and intestine, the adenomata of the liver, hypertrophy of the prostate, struma thyroidea and hypernephroma. Among the pre-cancerous diseases pernicious anemia must also be enumerated. There may be a connection between rectal cancers with chronic constipation, hemorrhoidal disease, and other apparently benign affections of the rectum.

MILL.

Abderhalden's Reaction in Carcinoma—R. ST. LEGER BROCKMAN, *Lancet*, Nov. 15, 1913.

The blood of persons suffering from carcinoma contains a substance which is absent from the blood of all other persons, and this substance has a proteolytic action on the carcinoma tissue only. This substance is of the nature of a ferment. The test is of some practical advantage as an aid in the diagnosis of carcinoma, especially in such sites as the stomach and bowels. The test was positive in 100 per cent. of 25 cases of undoubted carcinoma, and negative in 20 cases in which carcinoma could be excluded beyond reasonable doubt, and in 2 cases beyond all doubt as they subsequently found their way to the post-mortem room.

SACHS.

INFECTIOUS DISEASES

Phagocytosis in Acute Infectious Diseases—H. SCHAFER-HIEBER, *Deutsches Archiv f. klin. Medizin*, Vol. CXII, Nos. 1 and 2.

In acute infectious diseases the phagocytic powers of the blood diminish with the rise of the febrile state. A marked increase in the phagocytic curve, i.e., the beginning of the phagocytic crisis, is prognostically favorable. Non-occurrence of the phagocytic crisis is a bad prognostic omen. As the patient's condition improves, the phagocytic ability of the blood again becomes normal. There exists no parallelism between phagocytic ability and hyperleukocytosis or leukopenia.

WESTERN.

Phagocytosis of Tubercle Bacilli in Sputum—J. D. RODÉZ, *Beiträge z. Klinik d. Tuberkulose*, Vol. XXVII, No. 1.

By observing the phagocytosis in the sputum one is enabled without employing body-foreign bacteria and leukocytes to obtain results similar to those attained by determining the opsonic index. Entirely fresh sputum in which the leukocytes have as yet not become disorganized must be utilized for this purpose. Little particles composed entirely of pus are placed on a slide, fixed, stained by carbol-fuchsin and counterstained by methylene-blue. Not less than 400 bacilli must be counted; then the number which have undergone phagocytosis should be counted.

FRY.

Specificity of the Cutaneous Tuberculin Reaction—M. KASAHARA, *Zeitschr. f. Kinderheilkunde*, Vol. IX, No. 1.

The question of the specificity of the cutaneous tuberculin reaction in spite of numerous clinical investigations is not as yet solved. It must be determined if the reaction phenomena are due to immunizing processes or if they are nothing else but inflammatory changes which could be produced by other poisons. Author has made a thorough histological study of 5 tuberculin papules, and comes to the conclusion that the v. Pirquet cutaneous tuberculin reaction must be considered to be a specific one.

MILL.

Diagnosis of Tuberculosis by Sputum Examination—W. S. DAVIS, *Med. Rec.*, Dec. 20, 1913.

A very accurate and simple procedure for the routine diagnosis of tubercle bacilli in the sputum is the method by which the bacilli are separated by treating the sputum with an equal volume of a saturated aqueous common salt solution, thoroughly shaking and allowing to stand for 6 hours, and then skimming the surface with a platinum loop and making a smear therefrom. The smear may be stained either by the ordinary hot method or slowly in the cold.

SACHS.

Tuberculosis in Early Childhood, Diagnostic Failures—A. SCHLOSSMANN, *Zeitschr. f. Tuberkulose*, Vol. XXI, Nos. 1 and 2, 1913.

Diagnostic failures in tuberculosis are still possible in spite of the various tuberculin tests and instantaneous röntgenography. The case of a tuberculous child which became affected with meningitis was diagnosed as tuberculous meningitis. The cerebrospinal fluid, however, showed the presence of meningococci.

FRY.

Pulmonary Tuberculosis—D. B. LEES, *Brit. Jour. Children's Dis.*, Dec., 1913.

The diagnosis of pulmonary tuberculosis is more difficult in children than in adults. In children percussion is less easy than in adults. The existence of mixed infections which are more common in children than in adults makes the diagnosis by percussion more difficult, but the discovery of the six typical dull areas at the four apices is sufficient ground for asserting either that a fresh infection by pneumococci, streptococci, or the microbes of diphtheria, of measles, or of whooping cough is accompanied by a tuberculous infection, or that the fresh infection has attacked a child who is already tuberculous. Careful and accurate percussion is of primary importance in the diagnosis of early pulmonary tuberculosis, and by percussion one can detect the disease at a much earlier period than is possible by any other method of investigation.

SACHS.

Muscle Pain in Tuberculous Pleuritis—E. ISSERSON, *Beiträge z. Klinik d. Tuberkulose*, Vol. XXVII, No. 1.

In all cases of pleuritis author found sensitiveness of the muscles on the affected side. Occasionally there ensued increase in mechanical muscle irritability, muscular atrophy, pressure sensitiveness of the nerve fibers and slight disturbances of sensibility. The muscle pains are of undoubted nervous origin; they are either of a reflex

character or, what is more probable, toxic in origin or they are caused by a myositic process. The atrophical state is not the consequence of inactivity, but is due to toxic or continued neuritis.

FRY.

Tuberculous Pleural Fluids—S. R. GLOYNE, *Lancet*, Nov. 29, 1913.

Author found tubercle bacilli in 40 per cent. of the seras, and in 71.43 per cent. of the purulent pleural fluids which were of supposedly tuberculous origin. In purulent fluids an ordinary film preparation is satisfactory, but in serous fluids more careful measures are necessary. When a clot is present in a serous fluid, it should be carefully examined, but if it is not present, sedimentation and centrifugation must be instituted. A lymphocytosis is suggestive of tuberculosis.

SACHS.

Rheumatism and Tuberculosis—A. MENZER, *Berliner klin. Wochenschr.*, Dec. 1, 1913.

Chronic rheumatism is produced by infection from latent foci which contain streptococci, pneumococci, and not rarely tubercle bacilli. Hence it is not sufficient to ameliorate the peripheral symptoms. It is essential that the chronic latent infective process be abolished. It is for this reason that the administration of salicylic acid preparations be discontinued. These preparations disturb the natural process of immunization.

MILL.

Pneumococcal Influenza—WALB, *Deutsche med. Wochenschr.*, Dec. 4, 1913.

Since the two great epidemics of influenza in the years 1889 to 1890 and 1892, cases of genuine influenza have only appeared sporadically. That what nowadays is usually designated as influenza is a pneumococcal infection in most instances. This infection differs from that caused by the influenza bacillus by its much longer period of incubation, lasting a number of days. Again, the further course of both infections is quite at variance. In pneumococcal infection there is no predisposition to affections of organs other than the respiratory organs, the tissues and sinuses of the nasopharynx and the middle ear.

MILL.

Serum Disease—L. AXENOW, *Jahrbuch f. Kinderheilkunde*, Vol. LXXVIII, No. 5.

A statistical report of 683 cases of serum disease in the municipal hospital for children in St. Petersburg. The prognosis should al-

ways be guarded as the mortality was 8.5 per cent. The cases were such of scarlatina which had been treated with Moser's serum. Like Moser, author is of the opinion that serotherapy in scarlatina should be limited to the gravest instances of the affection. It is not quite clear whether some symptoms occurring in serum disease may have to be assigned to the primary scarlatina or to the serum administration.

MILL.

Cerebrospinal Fluid in Syphilis—E. GAMPER and K. SKUTEZKY, Wiener med. Wochenschr., Sept. 22, 1913.

Results of the examinations of the cerebrospinal fluids of 28 cases of syphilis with beginning or very recent eruption. None of the patients had been treated antisyphilitically, and all showed a positive Wassermann reaction in the blood. In 50 per cent. of the cases the spinal fluid was normal. In the remaining 50 per cent. of the cases pathological changes, as pleocytosis, increased pressure, etc., could be demonstrated. In 28.5 per cent. of the latter cases clinical symptoms pointing to the involvement of the central nervous system were noted. These symptoms consisted of headache with nocturnal exacerbation, and palsies of the facial nerve or the eye muscles. The Wassermann reaction was positive in 4 specimens of the cerebrospinal fluid.

MILL.

Complement Fixation Test in Gonococcus Infection—H. L. ROCKWOOD, Cleveland Med. Jour., Dec., 1913.

Author discusses personal experience with the complement fixation test in gonococcus infection. Conditions as urethral stricture, indurated epididymes following acute attacks of epididymitis, exostoses, or ankyloses following acute arthritic conditions, hydrosalpinx with no pus, hypertrophic veru montanum, are frequently post-gonorrheal conditions. Patients afflicted with one or more of these lesions may still harbor gonococci, but continued presence of the organisms is no longer accountable for the pathological lesion. It is therefore equally true that gonococcal antibodies may or may not continue in such cases, and a test of the blood serum will give positive or negative results as the case may be. A further point to be made in this connection, however, is that when the gonococcus is present in such conditions as those just enumerated, the fact is much more surely determined by the fixation test than by a bacteriological search as usually conducted. Probably the most serviceable application of the test is found in cases clinically cured.

WESTERN.

Rumpel-Leede Phenomenon in the Diagnosis of Scarlet Fever—G. RICHARDSON, *Edinburgh Med. Jour.*, Dec., 1913.

A domette bandage is tied tightly around the arm immediately above the elbow, the correct pressure being such that the pulse is just perceptible above the wrist. At the end of 15 minutes, if the bandage has been properly applied, the arm should be markedly cyanosed. Should the arm become a dead mottled white, the reaction will not be obtained. When the bandage is removed the skin at the fold of the elbow on the side distal to where the bandage has been is examined for the appearance of a widely varying number of minute patchial hemorrhages, fairly deeply seated which do not disappear on pressure, and are in fact made more evident by stretching the skin. The test is one of eminently practical value. Of a series of 48 cases sent in to the hospital for observation for scarlet fever there was not a single case which was negative to the test and which subsequently desquamated.

SACHS.

Scarlatinal Eruption, Phenomena following its Decline—O. KIRSCH, *Wiener klin. Wochenschr.*, Nov. 6, 1913.

After desquamation of the scarlatinal eruption a functional disturbance of the most superficial arterial and venous vessels may be noted. This disorder consists of a relative narrowing of the blood-vessels. Minor forms of irritation, however, may cause marked dilatation of these vessels. Similar conditions probably also prevail in post-scarlatinal spastic contraction of the vessels in the glomeruli.

MILL.

Bleeding in Typhoid Fever—R. D. RUDOLF, *Am. Jour. Med. Sci.*, Jan., 1914.

Hemorrhage occurring in the course of typhoid fever is a serious matter, especially when it appears late in the disease. However, the degree of seriousness of this complication has been differently estimated by various writers. The temperature often tends to decline after a hemorrhage, but there is usually a rise in the rate of the pulse, so at least is stated by a number of authors. In the writer's experience, however, the temperature and pulse rate fall together, with a frequent improvement in the general condition of the sufferer. The last 1591 cases of typhoid fever treated in the Toronto General Hospital showed a mortality of 8.67 per cent. over all; on the other hand, the death rate among those reported as having had one or more hemorrhages was 37 per cent. In this series, if the cases with bleeding be excluded, the mortality of the remaining 1464 cases was only 6.3 per cent.

WESTERN.

Typhoid Cholecystitis—A. E. MORISON, Brit. Med. Jour., Dec. 20, 1913.

Inflammation of the gall-bladder without stones may produce the same symptoms and signs as occur in cases of cholelithiasis. In typhoid cholecystitis there may be no history of typhoid fever, no record of any exposure to infection, and yet this disease may be the cause of a serious illness. In many of these cases the Widal reaction may be negative, and the course of the illness only can be cleared up by an operation and a bacteriological examination. The symptoms of typhoid cholecystitis do not always refer to the gall-bladder. The chief symptoms are a feeling of malaise and sickness, with a slight evening rise of temperature (99.5 to 101 deg. F.) and occasional attacks of pain accompanied by rigidity of the abdominal muscles, not always localized to any special area in the abdomen. These attacks, if severe, occur regularly every third or fourth day, are accompanied by vomiting and rise in temperature, and are followed as the temperature increase subsides by heavy night sweats. If during the attack, or after the acute pain has passed away, muscular rigidity is not pronounced, the gall-bladder, sensitive to touch and more or less distended can be felt. SACHS.

Variation of the Bacillus Typhosus—W. H. HORROCKS, Jour. Royal Army Medical Corps, Nov., 1913.

It is clearly shown that the *B. typhosus* may be converted into *B. fæcalis alcaligenes*. Author is unable to afford any evidence as to the epidemiological significance of this variation. The *B. fæcalis alcaligenes* appears to have no pathogenic effect on ordinary laboratory animals, and it has not been possible to reconvert this variant into the *B. typhosus*. SACHS.

Rheumatic Nodules Associated with Rheumatic Torticollis—F. P. WEBER, Brit. Med. Jour., Dec. 6, 1913.

Endocarditis generally accompanies rheumatic nodules, though the auscultatory signs are not quite decisive. Author describes a case of rheumatic nodules with rheumatic torticollis. Similar "rheumatic torticollis" occurring after a mild attack of acute rheumatism has not rarely been diagnosed as due to tuberculous caries of cervical vertebræ, and treated accordingly. In the case described the wry-neck first appeared at the end of September, and the rheumatic nodules ensued about half a month later. SACHS.

Differential Diagnosis of Sepsis and Pyemia—W. NACKE, *Zeitschr. f. Geburtshilfe u. Gynäkologie*, Vol. LXXIV, Nos. 2 and 3.

In sepsis there is (1) a very rapid rushing pulse, (2) beginning or pronounced peritonitis, (3) continuous impression of the presence of serious disease. In pyemia, on the other hand, we notice (1) more than three chills (when other affections are excluded), (2) absence of peritonitis, (3) impressions of serious disease only at the time of the chills.

MILL.

Acute Malignant Glanders in Man—W. E. MUSGRAVE and A. G. SISON, *Philippine Jour. of Sci., Sect. B, Tropical Medicine*, Oct., 1913.

The period of incubation is unknown. The onset is similar to that of a number of severe acute infections; usually, it is rather sudden with chill or chilly sensations with fever and indefinite aching pains. In some cases there is a prodromal period of indefinite symptoms. In still other cases the onset resembles that of pneumonia very closely, and it may not be possible positively to differentiate the two conditions until the absence of the expected consolidation is noted. The fever usually runs a more or less irregularly remittent course, varying from 38 to 40 or even 41 deg. C. at times. The pain at first may be more or less general in character, similar to that usually seen in dengue. More often, however, from the first and in all cases after the disease is fully established the pains localize in the joints—particularly the larger joints—as the elbows, knees, ankles, etc. The joints rapidly become swollen and painful and the skin glistening, as in rheumatic fever. Later, fluid accumulates, and in the course of a few days suppuration is found in one or more joints. The aspirated contents of the joints shows pure culture of *B. mallei*. The lymphatic glands in various parts of the body and particularly around the primary focus of infection, when one is present, rapidly become swollen and tender and gradually suppurate, and in some instances, when the patient lives long enough, break down and cause open ulcers. The skin lesion is a very striking and characteristic one. The lesions never are exceedingly numerous, and sometimes only a few will be found until toward the end when they usually become very numerous. They appear one or a few at a time, and, while showing a predilection for the face, neck, back, and chest, may be seen on any part of the body. The first skin lesions usually appear in from 4 to 7 days after the onset of the disease, and others continue to appear throughout the course of the disease. The lesions appear at first as simple superficial papules which rapidly enlarge and soon become vesicles, then pustules, and then break down and become open sores. The lesions

always appear to be superficial, although careful examination reveals a surrounding area of infiltration, and section shows that the infiltration extends through all layers of the skin. During the vesicular stage, the superficial raised character of the lesion resembles that seen in impetigo contagiosa. One very striking clinical feature of acute glanders is the marked depression and general appearance of serious illness that develops early in the disease and continues throughout its course. The patients gradually sink into unconsciousness a few days before the end. The disease frequently is not diagnosed during life and rarely during its early stages. This, too, in spite of the fact that the diagnosis is very easy to make clinically and its confirmation by laboratory methods a simple and easy procedure. The reason why the diagnosis is not more often made is due to the rarity of the infection. Most physicians never have seen a case. Glanders is most frequently mistaken for dengue fever, rheumatic fever, syphilis, or typhoid fever, and less frequently for pleurisy, pneumonia, and certain skin diseases, particularly impetigo contagiosa, pemphigus, or ecthyma. Dengue may be eliminated by the well-known blood picture of this disease. The value of early blood cultures as a diagnostic method in glanders needs further study. The only excuse for confusing glanders with the skin diseases mentioned is in the similarity of the local lesions. The pronounced constitutional manifestations of glanders should obviate this mistake more often than it does. The prognosis in this form of glanders is bad. The disease probably is a general infection practically from the beginning and rapidly becomes a virulent pyemia.

WESTERN.

RESPIRATORY AND CIRCULATORY ORGANS

Non-Tuberculous Apical Disease—LITZNER, *Münchener med. Wochenschr.*, No. 4, 1913.

Not every catarrh of the apices spells tuberculosis. Pneumonokonioses, causing induration and shrinking, may have their seat in the upper lobes. This is especially the case in anthracosis. Characteristic of pneumonokoniosis is a general well-being, normal temperature, absence of tubercle bacilli and negative tuberculin reaction. There may also occur catarrhs of the apices of bacterial origin other than tuberculous. Such processes may originate from a diffuse bronchitis or from a primary infection of an apical bronchus by the influenza bacillus, the pneumococcus or pseudotubercle bacillus. Affections of the apices called forth by pneumonomycoses, atelectases,

collapse induration, infarcts, tumors and echinococci may also be mistaken for apical tuberculosis. MILL.

Pneumonia and Heart Disease—O. KELLER, *Deutsche med. Wochenschr.*, Nov. 6, 1913.

In a middle-aged patient, in whom there is a possibility of latent arteriosclerosis, a pneumonic process may give rise in the heart, the place of least resistance, to clinical manifestations of arteriosclerosis. MILL.

Phleboliths—J. HALL-EDWARDS, *Brit. Med. Jour.*, Dec. 13, 1913.

A phlebolith is a calcareous concretion developed within a vein. Author who has either taken or supervised the taking of twenty thousand radiographs has failed to obtain the image of a phlebolith outside the pelvic area. In all cases in which phlebolithic images are found, it must be assumed that a phlebitis has been present at some period of the patient's life, and that a dilated condition of the veins still exists. In subjects under 40 years of age, their presence indicates early degenerative changes of a degree of importance nearly approaching that ascribed to the presence of atheroma. There is plenty of evidence to prove that phleboliths do not exist in perfectly healthy and normal individuals—at any rate until advanced age is reached—whilst there is little or no proof that they are the natural results of senility. SACHS.

Examinations with the Energometer of Christen—E. DROUVEN, *Deutsches Archiv f. klin. Medizin*, Vol. CXII, Nos. 1 and 2.

The energometer evinces that the energy of the pulse-impulsion is not of a constant stable nature even in individuals with healthy hearts. The energy is increased during muscular exertion; the same is the case in cardiac hypertrophy when the increased cardiac activity is of immediate benefit to the arterial system. Continued bodily exertions are followed by increased cardiac activity lasting a few days. WESTERN.

Varying Ventricular Complexes—A. E. COHN, *Heart*, Vol. V, No. 1.

Description of a case which during a period of 6 months showed almost continuous cardiac failure. During this period, the rhythm of the heart beat changed from one showing lengthened conduction-

time and incomplete heart-block to a rhythm showing complete auriculo-ventricular dissociation. Over part of the time the patient took digitalis. On one occasion during the stage of complete dissociation, the complexes representing ventricular contractions varied from beat to beat. This phenomenon was probably due to digitalis intoxication. The patient recovered from the condition completely and has been well for two years. SACHS.

Auricular Fibrillation—W. B. JAMES and T. S. HART, *Am. Jour. Med. Sci.*, Jan., 1914.

The following conclusions are reached: In auricular fibrillation palpation of the radial pulse is a misleading guide to the determination of the condition of the circulation. The pulse deficit is a simple and useful means of following the progress of cases of auricular fibrillation, and of confirming observations on the value of various therapeutic measures, including the activity of various preparations of different drugs. The relative deficit is of value in the diagnosis of suspected cases of fibrillation. The ordinary method of estimating blood pressure is misleading in cases of auricular fibrillation; it may with advantage be replaced by estimating the average systolic blood pressure, which gives an approximate measure of the real systolic blood pressure. The administration of digitalis elevates blood pressure in cases of auricular fibrillation. WESTERN.

Cardiac and Renal Dyspnea—T. LEWIS, J. H. RYFFEL, C. G. L. WOLF, T. COTTON and J. BARCROFT, *Heart*, Vol. V, No. 1.

Many patients who are the subjects of cardiac disease exhibit considerable breathlessness, but they show no cyanosis or they lack an equivalent cyanosis. In these patients the dyspnea is due to a condition of acid intoxication. This form of acidosis occurs usually in elderly subjects who have lesions in the heart, arteries and kidneys in varying degrees. It is often accompanied by periodic breathing of the Cheyne-Stokes type and by attacks of intense dyspnea meriting in some cases the term uremic, in other cases the term cardiac asthma. It is usually accompanied also by wasting, a rapid heart action (80 to 100), or a perverted heart mechanism, by signs of cardiac failure, by signs of renal derangement, and a subnormal temperature. High blood pressure is common. It is probable that there is no essential difference between cardiac and renal asthma, so-called, and that the dyspnea of the cardiac cases is in reality due ultimately to renal defects. Considering all forms of dyspnea, it seems probable that where the breathlessness is great

and where neither anemia nor cyanosis is conspicuous, such dyspneas arise in the majority of cases from acid intoxication. The cause of the dyspnea described is in sharp contrast to that in the pure cardiac cases where excessive accumulation of CO₂ in the blood sufficiently accounts for its acid reaction and the respiratory stimulus. SACHS.

Heart Irregularities in Diphtheria—W. E. HUME, *Heart*, Vol. V, No. 1, 1913.

A systematic examination of the heart in severe cases of diphtheria by graphic methods will corroborate the discovery that many forms of arrhythmia occur in the disease which cannot be recognized by ordinary methods of examination. SACHS.

ALIMENTARY TRACT

Cancer of the Lower Lip—J. C. BLOODGOOD, *Boston Med. and Surg. Jour.*, Jan. 8, 1914.

Author investigated 200 cases of cancer of the lower lip. In not a single case did a cancer begin in normal skin and mucous membrane. There was always a previous defect as a rule present some months before the signs of the development of the cancer. In many cases the original or precancerous lesion had been observed by the patient for years before the signs of cancer developed. Smoking seems to be the most common etiological factor. The smoker's burn is a distinct depression at the muco-cutaneous border, oblong in shape with its long axis at right angles to the muco-cutaneous line; the color and consistency of the mucous membrane and skin is changed, the tissue looks charred; it is not a scab because it cannot be picked off. Warts, ulcers from wounds and pimples are other precancerous lesions. SACHS.

Examination of Gastric Contents without Stomach Tube—H. FRIEDRICH, *Archiv f. Verdauungskrankheiten*, Vol. XIX, No. 5, 1913.

Author employs the gastrognot, a simple apparatus of his own design, to detect hydrochloric acid in the stomach contents without removing the latter by syphonage. The gastrognot consists of a thread impregnated with Congo red. On its distal end there is a metal button. The method does not only evince the presence of free hydrochloric acid, but also, whether there exists hyperacidity (dark

blue coloration), normal acidity (blue coloration) or subacidity (brown or violet coloration). After the thread is dry the differences in color become more pronounced. Unequal coloring of the thread are met with in the presence of contents that are incompletely chymified and rich in mucus i.e., in gastritis. In case the thread appears red at the anterior end, it indicates hypermotility. In the presence of hypermotility the metal button of the gastrognost has entered the duodenum after half an hour.

WESTERN.

Acidity and Age in Gastric Ulcer—A. PLAUT, *Archiv f. Verdauungskrankheiten*, Vol. XIX, Supplement, 1913.

In the prime of life, the most stable epoch of the organism, equal proportions of men and women are affected with gastric ulcer. During the period of development, on the other hand, women are much more frequently subject to the disease. Toward the end of the developmental period the frequency of the affection declines. Gastric ulcer and hyperacidity concur in but 29 per cent. of the cases.

WESTERN.

Polyposis Gastrica (Polyadenoma)—J. S. MYER, *Jour. A. M. A.*, Nov. 29, 1913.

The diagnosis in author's case was made possible through the presence of a small polyp in the wash-water during lavage, and the presence of a large polyp in the feces following a hemorrhage. In an extensive case, like the one of the author, the röntgenographic and fluoroscopic examinations should always be helpful. There was a mottled appearance of the entire right half of the stomach, as though the bismuth were trickling through and around numerous masses, together with the irregular and indefinite outline of the stomach. The repeated presence of fresh blood microscopically in gastric contents removed with care, or in the wash-water, is indicative of a redundant, vulnerable condition of the mucosa in which bits of tissue are readily removed by the tube. This should at least lead one to think of the possibility of polyposis. In severe, acute, gastric hemorrhage in a patient with achylia gastrica, abnormal mucous production and normal or increased gastric motility, polyposis is more than probable. Invagination of the pylorus by a polyp could hardly be mistaken for any other condition, after one has experienced the peculiar palpatory findings described in author's case. The etiology is very obscure, but it would seem probable that syphilitic gastritis was the underlying cause in the reported instance.

WESTERN.

Dilatation of the Stomach—A. E. MAYLARD, Glasgow Med. Jour., Nov., 1913.

A stomach which reaches down to and sometimes beyond the umbilicus is not necessary a dilated one; a perfectly normal viscus may occupy these positions. The symptom of succussion or splashing means simply the presence of gas and fluid in the stomach, and this may exist under perfectly normal conditions four hours after a meal. Percussion alone, or in conjunction with auscultation is not of much service in determining the existence of dilatation except in advanced cases. Two of the most striking symptoms indicative of dilatation, are the quantity and character of the vomitus, and the results of mechanical distension. When a patient vomits large quantities of brownish sour-smelling material, in appearance like thin porridge, it is certain that apart from merely prolonged retention, there is marked dilatation. It may be equally demonstrated by lavage when the same typical material may be withdrawn. With regard to artificial distension by gas, there is no mistaking the effect produced on a truly dilated viscus. A passive distension ensues, indicating an atonic condition of the muscle parieties, for unless the stomach has lost to a considerable degree the power of contraction, it very soon resents this hyperdistension, and contracting upon the forcibly introduced air, gives pain and discomfort to the patient, producing at the same time only a limited area of tympanicity in the epigastrium. Our means for the diagnosis of gastric dilatation have recently been considerably added to by the employment of the X-rays.

SACHS.

Gastric Tetany in the Adult—W. K. IRWIN, Brit. Med. Jour., Nov. 8, 1913.

In the majority of cases of gastric tetany dilatation of the stomach exists, and this dilatation owes its origin in most cases to the presence of a chronic ulcer in the pyloric region. The nervous symptoms consist of a tonic contraction of the muscles of the hand, forearm, feet and legs, but in a few cases tetanic contraction of the jaw and body muscles are present. The duration of the spasms may be from 4 minutes to several hours, or they may remain almost constant for 2 or 3 days. It often follows an attack of vomiting or diarrhea, and a spasm may sometimes be induced by percussing the epigastrium, by passage of a stomach tube, or by pressure on the main artery of a limb.

SACHS.

Fecal Vomiting in Gastric Crises—K. OCZESALSKI, Berliner klin. Wochenschr., Dec. 8, 1913.

Description of a case which was under author's observation for two years. The patient vomited fecal material, but there was no

detectable organic disease process within the gastrointestinal tract. Author assumes that the very violent antiperistaltic contractions of the intestine, occurring in some instances of gastrointestinal crises, may have given rise to the fecal vomiting. **MILL.**

Periodic Vomiting: Differential Diagnosis—H. STRAUSS, Wiener klin. Rundschau, 1913, No. 38.

Report of a series of pertaining instances. Among the cases which are wrongly classified as belonging to those of periodic vomiting in the sense of v. Leyden are atypical cases of tabes with painless gastric crises and certain cases of migraine without headache. **MILL.**

Gastric Function in Tuberculosis—G. MAUTZ, Zeitschr. f. Tuberkulose, Vol. XXI, No. 3, 1913.

Examination of 100 female patients with tuberculosis in every stage of the disease. Some of the patients had gastric disturbances, others were free from the same. The stomach function was tested by means of Ewald's test breakfast, Sahli's iodipin method and röntgenoscopy. In but 18 per cent. of the cases normal gastric conditions prevailed; in the great majority of the instances subacidity and motility disturbances were encountered. Gastropstosis was present in a great number of the cases. **FRY.**

Gastric Hyperacidity of Appendicular Origin—S. SOLIERI, Mitteilungen a. d. Grenzgebieten d. Medizin u. Chirurgie, Vol. XXVI, No. 5, 1913.

Author maintains that stomach affections, as the exclusive or most persistent expression of appendicular inflammation, are of much more frequent occurrence than is generally assumed. Dyspepsia of the appendix originates in childhood and develops gradually. Its main symptoms are epigastric pain immediately or soon after ingestion, flatulency, acid eructations, nausea, vomiting and objective hyperacidity. The epigastrium is sensitive in most of the cases. This is not so in other regions of the abdomen. The epigastric pain is occasionally produced by pressure in the vicinity of the appendix. In instances of chronic gastric disease with hyperacidity remaining uninfluenced by medicinal treatment, a chronic inflammation of the appendix may be at the bottom of the affection. **MILL.**

Glands and Follicles of the Appendix—C. NAGOYA, *Frankfurter Zeitschr. f. Pathologie*, Vol. XIV, No. 1.

The lymphatic apparatus of the appendix increases from the last months of fetal life until about the twentieth year, when its retrogression starts. The number of glands and their size also diminish after the twentieth year. WESTERN.

Radiologic Points in the Diagnosis of Chronic Appendicitis—G. SINGER and G. HOLZKNECHT, *Münchener med. Wochenschr.*, Dec. 2, 1913.

The diagnosis of chronic appendicitis is one of the most difficult chapters in internal medicine. Authors believe that the radiologic studies in regard to chronic appendicitis have been undertaken in a wrong direction. These studies were directed toward the radiologic visibility of the appendix. Success in this respect, however, is rare and the results are incomplete. Authors were the first to demonstrate the appendix radiographically. They succeeded in obtaining radiographs in 5 out of 14 cases. In this article a new method of radiologic examination is dealt with in extenso. The details must be read in the original. MILL.

X-Ray in the Diagnosis of Carcinoma of the Colon—J. T. CASE, *Interstate Med. Jour.*, Dec., 1913.

Röntgen findings in carcinoma of the bowel may be stated as follows: (1) Delay in the onward progress of the bismuth column following a meal of bismuth-mixed food. The nature of this interference varies with the location of the lesion. For instance, in cases of carcinoma of the hepatic flexure of the colon, the entire residue from a bismuth meal may crowd into the colon proximal to the lesion, with no marked ileal stasis resulting. This stasis in the colon may vary from 48 hours to several days. In some instances the obstruction may be complete. Cleansing enemata ordered to dislodge the stagnant bismuth-mixed residue are less and less successful, according to the degree of stenosis. Often the cleansing enemata fail to ascend the colon beyond the tumor. (2) The introduction of a bismuth clysma into the colon shows a characteristic arrest in the progress of the bismuth column, a hindrance which may be complete or may be overcome in a long or a short time, according to the degree of stenosis. It is not out of place to urge that the technic of Haenisch be followed to the very letter, if one hopes for reliable results. The head of the enema column, when it reaches the point of obstruction, may present a funnel-shaped shadow, after which the further filling of the bowel may be impossible, or the bismuth column may after a

time again dilate to its normal width. After some delay the entire bowel may become filled except at the site of the stenosis. When, as is the case in stenosis of the ascending colon, the bowel on the proximal side is not filled completely but presents an irregular, cauliflower-like shadow, care must be taken to eliminate the possibility of this appearance being due to insufficient pressure failing to force an adequate amount of bismuth suspension through the stenosed segment of intestine. Filling defects in the bowel shadow, similar to those produced by carcinoma, may be caused by fecal tumor, to which the term fecaloma has been applied by certain French writers. The source of error may be excluded by making sure of the thoroughness of the bowel cleansing previous to the examination. (3) A dilatation on the proximal side of the lesion. This dilatation is not necessarily great and may not be demonstrable during the bismuth examination. When present, it is evidence of a serious obstruction. The colon shadow may end at the obstruction in a funnel shaped process or there may be an irregular filling defect characteristic of a cauliflower carcinoma. (4) There may be a palpable tumor coinciding with the filling defect. A palpable tumor may not be present, and it hardly would be expected as a constant finding if one hopes to make a diagnosis which is comparatively early. It should be borne in mind, also, that palpable tumors in connection with bowel carcinoma may really be fecal accumulations. At times the dried fecal accumulations in the intestine, proximal to the seat of obstruction may assume a degree of hardness and resistance to palpation as the tumor itself. One would hardly expect to palpate a tumor, even if present, if it occupied the distal leg of the sigmoid or that portion of the colon which lies above the costal margin. The mobility of the tumor varies, according to the length of the mesentery and the degree of pericolic involvement. Transverse colon and sigmoid colon tumors usually possess the greatest degree of motility, and yet cases of carcinoma of the cecum and ileocecal valve have been seen in which the tumor was exceedingly freely movable. The writer believes that the presence of a palpable tumor should be considered a Röntgen sign, inasmuch as the palpation under the fluorescent screen is obviously superior to the ordinary method of palpation. (5) Author wishes to call attention to what he believes is a valuable sign in the diagnosis of serious colon obstruction—namely, exaggerated antiperistalsis. The prevailing movement in the proximal colon, that is, the cecum, ascending colon and right half of the transverse, is antiperistalsis, as has been shown by Cannon and others. Author does not refer to this normal antiperistalsis as a sign of bowel obstruction; but when the normal retrograde waves are exaggerated, this fact may be considered a sign of obstruction, analogous to the observation of antiperistalsis in the stomach in cases

of pyloric stenosis. The bismuth mixed colon contents may be found distributed in two zones, a large collection in the distended cecum and ascending colon and a series of bismuth masses in the distal colon, proximal to the obstruction, which on repeated examination, is seen to be in a state of peristaltic unrest, onward and retrograde peristalsis alternating. The administration of laxatives previous to the examination is likely to increase the probability of observing antiperistalsis. It should not be understood that the foregoing sign is found only in malignant obstructions. Any kind of bowel obstruction, malignant or benign, organic or spastic, will cause this alternating peristalsis and antiperistalsis with distinctly increased antiperistalsis in a degree varying with the severity of the obstruction.

WESTERN.

Chronic Stenosing Gastritis—H. W. SOPER, *Jour. A. M. A.*, Dec. 6, 1913.

Primary chronic stenosing gastritis always results from a long-continued, chronic inflammation. The hyperplasia affects chiefly the pyloric half of the stomach and ultimately results in a diminution in the lumen as well as a narrowing of the pylorus. The symptomatology is that usually observed in the progress of an ordinary chronic gastritis, except that signs of stenosis gradually appear. In late cases, hydrochloric acid is absent and lactic acid and Oppler-Boas bacilli are often present. A smooth indistinct resistance may often be palpated. The differentiation from diffuse scirrhus carcinoma may be difficult, as both may give the same stomach content findings. Occult blood is often absent in this type of carcinoma, as well as in chronic stenosing gastritis. The anamnesis and the course of the disease are the determining factors. Jonas has asserted that the Röntgen ray will show an insufficient or gaping pylorus in diffuse scirrhus carcinoma.

WESTERN.

Intramural Extension in Rectal Cancer—K. W. MONTSARRAT and I. J. WILLIAMS, *Brit. Jour. Surg.*, Oct., 1913.

Carcinoma of the rectum habitually remains localized within narrow limits for a considerable period. Permeation of lymphatic plexuses to a distance beyond the primary site is an exceptional process. Mucin production in the cells is to be interpreted as indicating special activity, and not degeneration. Glandular invasion is sometimes long delayed. Without wide local dissemination, the disease may make its way into bloodvessels, a process which may be responsible for distant metastases.

SACHS.

Functional Testing of the Liver; Alimentary Levulose-Hyperglycemia—

H. SCHIROKAUER, *Zeitschr. f. klin. Med.*, Vol. LXXVIII, Nos. 5 and 6, 1913.

Functional testing of the liver as regards carbohydrate metabolism is as yet of subordinate importance. It is questionable whether or not levulose possesses a special value in the determination of hepatic activity. The value of galactose for the same purpose is also problematical, because, heretofore, the galactose was only determined in the urine and not in the blood.

WESTERN.

Hepatic Function Tests: Lactose Tolerance as Influenced by the Liver

Necrosis of Chloroform Poisoning—S. H. HURWITZ and A. L. BLOOMFIELD, *Johns Hopkins Hospital Bull.*, Dec., 1913.

There is experimental evidence to show that in the intestinal tract of dogs lactose is split into its constituent molecules—dextrose and galactose—and that after feeding lactose to dogs, galactose is excreted in the urine. When lactose is split, the liver can form glycogen from galactose, but to a more limited extent and with greater difficulty than from the other monosaccharides. It is more accurate to determine the tolerance of an animal before producing a liver injury than to accept arbitrary standards of normal tolerance, expressed either in total number of grams or in grams per kilogram of body weight. Whereas the normal tolerance of dogs for lactose expressed in grams per kilogram of body weight is fairly constant, the total number of grams tolerated by different animals shows wide variations. Eck fistula dogs show a reduced tolerance for lactose, which, however, may result from flooding of the systemic circulation with sugar rather than from liver injury. In susceptible animals, central necrosis produced by chloroform poisoning results in the reduction of the lactose tolerance by 50 per cent. or more.

WESTERN.

Tests for Hepatic Function: Clinical Use of the Carbohydrates—A. L.

BLOOMFIELD and S. H. HURWITZ, *Johns Hopkins Hospital Bull.*, Dec., 1913.

A consideration of the extrahepatic factors involved in the sugar regulating metabolism, the influence of the glands of internal secretion and of the vegetative nervous system, the ability of other tissues than the liver to handle sugar, and the ability of the uninjured liver substance to compensate in disease, make the sugars theoretically unsatisfactory as tests for hepatic insufficiency. There are a series of great practical difficulties in applying the tests; namely, nausea, vomiting, and diarrhea after feeding, faulty absorption, intestinal fermentation, portal obstruction with collateral circulation, retention

of sugars in nephritis, and inconstancy in the diet. There are serious objections to the methods as they have been applied; namely, the use of arbitrary amounts of sugar, and the use of a definite standard of excretion. An analysis of the reports anent the carbohydrate tests for the determination of hepatic function shows their significance to be lessened, owing to confusion in the conception of hepatic insufficiency, insufficient clinical data, and neglect of the practical considerations mentioned. In short, the evidence from the clinical reports is not in such form as to prove or disprove the value of the tests.

WESTERN.

The Liver in Chronic Malaria—C. FRAGA, *Revue de Médecine*, Vol. XXXIII, No. 10, 1913.

In malaria the hepatic dulness is mostly normal; occasionally it is increased, rarely diminished. Malaria does not engender cirrhosis of the liver; cirrheses in chronic malaria are probably due to other factors, as alcoholism, undernutrition, etc. Grave instances of splenomegaly in malarial cachexia are not exclusively due to the malarial condition, but are frequently caused by ankylostoma. Functional testing of the liver did not evince a pronounced change in the organ which might be ascribed to the presence of malaria. Urobilinuria was found in half of the examined cases. Artificial glycosuria could not be produced. Alimentary lipemia could be demonstrated in almost every case.

ZIMMER.

Acute Pancreatitis—A. J. BLAXLAND and G. P. C. CLARIDGE, *Brit. Med. Jour.*, Nov. 29, 1913.

Though 5 of the author's 7 patients had gallstones in addition to the acute pancreatitis, only one gave a history of biliary colic or jaundice. Three cases had symptoms of indigestion for over a year with or without hematemesis which made one suspect perforated gastric or duodenal ulcer. In all the cases the condition started suddenly with pain and vomiting, the latter being frequent and copious, as is usually noted. In all the cases the abdomen was rigid and tender. An extreme degree of collapse was a marked feature in 4 of the cases. In author's opinion, the extraordinary amount of collapse is the only symptom which would suggest the diagnosis; but in some cases, probably of a less acute nature, assistance may be obtained by finding a localized resistance in the upper part of the abdomen:

SACHS.

NERVOUS SYSTEM

Acute Epidemic Poliomyelitis—C. KLING and C. LEVADITI, *Annales de l'Institute Pasteur*, Vol. XXVII, Nos. 9 and 10, 1913.

Authors concur with Wickman that acute epidemic poliomyelitis is transmitted by contact with persons. The transmission of the infection is proved by typical and abortive forms of the disease which are readily overlooked, are not isolated and these form the majority of the cases. In a circumscribed and isolated location, the disease appears abruptly, progresses readily, shows for a time the usual manifestations, and disappears entirely. The incubation period may not exceed 2 or 3 days. During this stage the diseased appear to be contagious. The affection may develop in two phases which are separated from each other by a period of improvement lasting from a few days to a couple of weeks. During this period of improvement the patient may infect his surroundings. Authors show that the hypotheses of the transmission of the disease by the air, milk, dust, flies, bed bugs, mosquitoes are neither experimentally nor epidemiologically tenable. Whether or not *Stomoxys calcitrans* plays a part in the propagation of the disease is not as yet definitely settled.

ZIMMER.

Nervous Pyrexia in Tabes Dorsalis—R. SIGRIST, *Münchener med. Wochenschr.*, Dec. 9, 1913.

The attack-like appearance of temperature elevation in the course of tabes dorsalis, and lasting a few days at the time, is a very rare occurrence, but it may be of differential-diagnostic import. Author reports a case of this kind. In this case the temperature elevations appeared in the form of crises which ran parallel to pain crises. For these crises only the tabetic affection could be held responsible.

MILL.

Parasyphilis of the Nervous System—J. MCINTOSH and P. FIEDES; H. HEAD and A. G. FEARNSIDES, *Brain*, July, 1913.

Parasyphilitic states are peculiarly liable to arise after mild syphilitic infection. With acute or chronic syphilis of the nervous system other than parasyphilis, the behavior of the cerebrospinal fluid depends upon the extent to which spinal cord and its membranes, including those of the brain stem are affected. All tertiary and para-

syphilitic manifestations are expressions of the reaction of hypersensitized tissues (hyperallergie). Thus the clinical manifestations of parasyphilis are an expression of the reaction and necrosis of hypersensitized areas of the nervous system evoked by reappearance of the spirocheta pallida. Parasyphilis is a clinical conception and from a pathological point of view the term is inadmissible. SACHS.

Myotonia Atropica—F. KENNEDY, Jour. A. M. A., Nov. 29, 1913.

Report of a pertaining case. Myotonia congenita, so-called Thomsen's disease, is not very uncommon, but the combination of increased tonus in some muscles with a primary flaccid palsy in others in remarkably constant distribution is so rare that but 4 cases have been reported as yet in American medical literature. The combination of premature bilateral cataract with atrophy of the temporal, orbicular, masseter, sternomastoid, vasti and anterior tibial muscles, together with a sharply contrasted myotonus in the hands, occurs too frequently to be ignored and most probably points to a deficient hereditary endowment as the approximate cause of the disease.

WESTERN.

Paralysis of the Quadriceps Femoris—L. MAYER, Am. Jour. Surg., Dec., 1913.

Author's study of paralysis of the quadriceps extensor indicates the errors of the current teaching relative to this paralysis. Volkmann and Hoffa are incorrect in their thesis that quadriceps paralysis invariably leads to a genu recurvatum. Duchenne and Oppenheim are equally incorrect in maintaining the inability of a patient thus paralyzed to stand with knees flexed. It is not only possible to stand with knees flexed, but also to walk in a manner strikingly similar to the normal, as demonstrated by cinematographic records, to climb stairs and to rise from a low chair—actions for which on first thought the quadriceps seems indispensable. Its action can, however, be replaced to a great extent by the weight of the body, provided the other muscles of the thigh and leg are well developed and properly co-ordinated. A moderate degree of equinus position aids in this extensor effect of the body, by bringing its center of gravity posterior to the new fulcrum (the heads of the metatarsals) thus established. The gluteus maximus and the soleus act directly as extensors of the knee by drawing the thigh and calf backward.

WESTERN.

Metallic Poisons and the Nervous System—G. A. MOLEEN, Am. Jour. Med. Sci., Dec., 1913.

A wide variation exists in individual susceptibility to all metallic

poisons. In those susceptible, if the nervous system is attacked, the peripheral nervous system is the most vulnerable, and more especially the extensor supplies. There is with lead poisoning, in all probability, an early lymphocytosis of the cerebrospinal fluid, and probably coincident with, or succeeding upon, the basophilic granulation of the red blood cells. Non-inflammatory degenerations of any portion of the peripheral system should suggest the metals as a possible cause. In the absence of skin evidences of arsenic and the blue line of lead, the urine, the blood, and finally artificial abscesses may be induced and examined for the metals; this procedure should lend itself as a diagnostic as well as a therapeutic aid. A positive Wassermann reaction would not seem to exclude, especially lead, in favor of syphilis in primary nerve or tract degenerations. The source of the poison may not be detectable until long after the presence of the metal as a cause, has been established.

WESTERN.

Localization of Intracranial Tumors—T. G. MOORHEAD, Medical Press (London), Nov. 12, 1913.

It is obvious that tumors may involve more than one part of the brain, and also that multiple tumors are by no means uncommon. Tumors occurring even in such parts of the brain as the Rolandic region may be entirely unaccompanied by localizing signs, doubtless due to their slow growth and the consequent adaptation of surrounding structures to their presence. Paralysis of the sixth nerve is comparatively unimportant from a localizing point of view. Horsley's contention that optic neuritis is most marked on the side of the growth is almost invariably correct.

SACHS.

Sydenham's Chorea—F. LANGMEAD, *Lancet*, Dec. 20, 1913.

The choreic child is often highly strung, easily frightened and as easily elated. The early phases of chorea are marked by an exaggeration of this state, or by what may be called a condition of psychical unrest. Deterioration in writing and arithmetical powers may be noted some weeks before erratic movements are obvious. If the child be asked to extend its hands straight in front, a little involuntary movement of the fingers may be noted, and the movement becomes more active if the child be asked to repeat the alphabet, or recite some simple piece. Slight evidence of muscular weakness may be noted; wrist-drop may appear and the head may fall forward and the shoulders stoop. Movements of the tongue or lip may evoke chirping noises which are quite characteristic. The pupils may be unequal in size, a sign which the author has previously spoken

of. The larger pupil may react to light and accommodation more slowly than its fellow. There may be a change in shape of one of the pupils; it may become ovoid or irregular during the attack. The most characteristic eye phenomenon is hippus—the pupillary margin of the iris oscillates back and forward when accommodation is attempted, or a light shone into the eye. SACHS.

Seroreaction (Abderhalden) in Epilepsy—O. BINSWANGER, Münchener med. Wochenschr., Oct. 21, 1913.

The epileptic-convulsive attack concurs with disintegration processes within the cerebral cortex. This fact has been demonstrated in a few cases. In one case it could be shown that these disintegration processes were in immediate connection with the epileptic seizure for Abderhalden's reaction was negative in the blood obtained two weeks after the last attack. The import of the reaction is especially a prognostic one. MILL.

Serodiagnosis in Psychiatry—M. THEOBALD, Berliner klin. Wochenschr., Nov. 24, 1913.

Dementia præcox may often be differentiated from other psychic affections by means of Abderhalden's dialyzation method. MILL.

The Passing of Paranoia—J. B. MACDONALD, Boston Med. and Surg. Jour., Jan. 1, 1914.

Of late years there is a rapid decrease in the number of cases of paranoia on record, coincident with the acceptance of Kraepelin's idea of absence of intellectual impairment as an essential condition of the picture of this state. To-day the psychiatric trend seems to have caused the passing of true paranoia from the list of common psychoses. In reviewing case histories it is of interest to note that where the original diagnosis was sustained, hallucinosis as a symptom was absent, while this symptom was prevalent at some stage in the psychoses in those cases with a mistaken classification of paranoia. SACHS.

URINARY ORGANS—MALE GENITALIA

Important Sources of Error in the Phenolsulphonephthalein Test of Renal Function—M. ROTH, Berliner klin. Wochenschr., Sept. 1, 1913.

Conditions in women with genital disease or during pregnancy interfere with the test. It is important to empty the bladder completely, otherwise there may be enough residual urine left to interfere with the findings. The drug as put out by the various manufacturers varies, causing thereby widely different reactions. The lumbar muscles should be used as the preferable site of injection, as there are several things to be noted when using the gluteal muscles, i.e. there may be defective absorption or delayed absorption, all depending on the depth to which the needle is introduced. KAUFMAN.

So-called Movable Kidney Disease—P. HICKS, Practitioner (London), Dec., 1913.

Nephroptosis is only a part of a general splanchnoptosis, which latter will develop sooner or later. Nephroptosis is often the cause and origin of symptoms. Apart from local pains, such a result as postural albuminuria is a symptom referable to nephroptosis alone. The earlier stages, i.e. the lesser degrees of nephroptosis cause the more direct kidney symptoms. In these cases the parts are recently disturbed, the blood supply and the innervation of the kidney are subject to more interference than in the later degrees, where the organ has worked completely loose. SACHS.

Observations of Acute Hemic Infections of the Kidney—G. E. BREWER, Am. Jour. Urol., Dec., 1913.

From a study of experimental data and clinical experience, author concludes that (1) during the progress of acute infectious diseases, microorganisms find their way into the blood current and that many of them are excreted by the kidneys. With the organisms few in number, their virulence low and the kidneys healthy, there may be no lesion produced. If, on the other hand, there are a large number of organisms present, whose virulence is high, and one or both of the kidneys diseased, lesions are produced which may give rise to a fatal toxemia or renal suppuration. (2) The lesion may be bilateral but is usually unilateral. This is explained on the basis of lowered resistance in that particular kidney. (3) The presence of such a kidney is a menace to the individual. (4) In animals pathological lesions

were produced by the introduction of colon bacilli, streptococcus pyogenes, staphylococcus pyogenes aureus, typhoid bacilli, pneumococcus and bacillus pyocyaneus. Clinically only the first four were isolated. (5) Ascending infections are hard to produce experimentally, while it was easy to produce hæmatogenous infections. These experiments seem to bear out the now commonly accepted theory as to the production of renal infections.

KAUFMAN.

Pyelitis in Children—L. CHEINISSE, *Semaine Méd.*, Dec. 3, 1913.

Author emphasizes the importance of examining the urine in every case of fever of obscure origin, in children. Urinary suppuration is very common in young children, especially the colon bacillus infections of the bladder and kidney. The kidneys of young children are very susceptible to injury of all kinds. In adults, renal calculi play a very important part in the causation of pyelo-nephritis, while the acute infectious diseases and gastrointestinal disturbances are the chief underlying causes for this condition in children. These children all develop a high fever, are restless, vomit, have diarrhea and mucus stools, rapid breathing, a yellowish and even jaundiced tint and chills. These chills are very suggestive, as children very rarely have them, even in malaria. The fever is, at first, remittent or intermittent, and the diagnosis of typhoid may be made. In some children, there are periods of pyrexia alternating with non-febrile periods.

KAUFMAN.

Renal and Uretral Calculi—H. D. FURNISS, *Am. Jour. Obst. and Dis. Women and Children*, Dec., 1913.

Renal and ureteral calculi are very common, and often exist for a long time without giving any symptoms. The classical symptoms are often associated with other lesions of the urinary tract. The location of the calculi is the most important factor in the determination of the symptoms, those in the pelvis of the kidney and the ureter causing the greatest amount of damage and the severest symptoms.

KAUFMAN.

Forty-eight Successive Cases of Nephrectomy with Four deaths—A. FULLERTON, *Brit. Jour. Surg.*, Dec., 1914.

The mortality of nephrectomy has diminished in recent years owing to the more efficient means of early diagnosis at our disposal, and especially to more accurate information obtainable by means of the ureteral catheter. In most cases of unilateral disease of the kidney the urine of the affected side will be found to have a diminished

specific gravity. This is due in the early stages to increased flow of blood to the organ caused by irritants such as calculus and tubercle. It is not good surgery to remove a diseased kidney until satisfactory evidence has been obtained as to the functional capacity of its fellow. If the urine obtained from the presumably sound side has a specific gravity of 1015 or over, is passed in sufficient quantity, and is free from albumin, pus, and blood, it is reasonably safe to remove the affected organ.

SACHS.

Pathology of the Prostate—E. O. SMITH, *Jour. A. M. A.*, Dec. 6, 1913.

The prostate gland has five distinct glandular areas, which may be termed lobes. Pathologic changes in the seminal vesicles are often overlooked and the prostate alone considered, when in fact both are involved. Tuberculosis of the prostate is seldom found without the same infection of seminal vesicles. Prostatic hypertrophy is usually a simple adenomatous growth which crowds the normal prostate, so as to form a surgical capsule. In the roof or anterior portion of the prostatic urethra these new growths are covered with but little more than mucous membrane. Malignancy of the prostate is confined to the posterior lobe.

WESTERN.

Sarcoma of the Prostate—C. G. CUMSTON, *Am. Jour. Urology*, Nov., 1913.

A sudden attack of retention of urine in a child and the appearance of a tumor in the hypogastrium or perineum followed by disturbances in the physical condition, terminating rapidly in cachexia, will put the medical man in the way of reaching a correct diagnosis if he will only bear the prostate in mind. In elderly people the disturbances of micturition and defecation with evidences of cachexia should also be signs of warning. In carcinoma of the prostate the tumor is harder to the feel than sarcoma. The former gives rise to hematuria, and when it extends outside of its capsule is apt to compress the sacral plexus. In simple prostatic hypertrophy the dysuria is more pronounced, while the gland is more regular in shape and is less disposed to cause pressure on the rectum. Elongation of the prostatic urethra is much more marked. The differential diagnosis of sarcoma of the bladder is frequently a matter of some difficulty, particularly when the growth develops in the fundus and in young children. In adults rectal examination will show that the prostate is not enlarged. The diagnosis of perineal abscess will only be made when a careless examination has been resorted to, while in hydatid cysts of the small pelvis the evolution is slow, and if search is made for eosinophilia and the fixation reaction of Weinberg and Parvu is resorted to, a positive diagnosis of hydatid cyst will be made.

KAUFMAN.

FEMALE ORGANS OF GENERATION—PREGNANCY—
PARTURITION—INFANTS

Serodiagnosis of Pregnancy—G. WOLFF, *Monatsschr. f. Geburtshilfe u. Gynäkologie*, Vol. XXXVIII, No. 4.

Abderhalden's reaction is of especial value in the differential diagnosis between tumor and pregnancy. The dialyzation method has no place in general practice. MILL.

Serodiagnosis of Pregnancy—H. WILLIAMSON, *Jour. Obstet. and Gynecol. of Brit. Emp.*, Oct., 1913.

The ferment contained in the blood serum of pregnant women can be demonstrated from the eighth week of pregnancy until ten days after delivery. The results of the test can only be relied upon when done by an expert. Most of the common sources of error have already been detected, and in the near future the test may be expected to give reliable results. SACHS.

Serodiagnosis of Pregnancy—A. SCHERER, *Berliner klin. Wochenschr.*, Nov. 24, 1913.

Abderhalden's dialyzation method, if properly executed and interpreted, is a valuable diagnostic adjuvant in pregnancy. It serves a good purpose in the presence of a gravid retroflexed uterus in which the anatomic findings do not permit of a definite diagnosis in the early stages of pregnancy; when its early recognition is of importance, as in the presence of serious heart disease, tuberculosis, etc., and in the differential diagnosis between extrauterine pregnancy and tumor of the adnexa. MILL.

Position of Heart and Diaphragm in Pregnancy—T. HEYNEMANN, *Zeitschr. f. Geburtshilfe u. Gynäkologie*, Vol. LXXIV, Nos. 2 and 3.

At the termination of pregnancy the diaphragm is nearly always pushed upward. Röntgenographic studies showed that the upward dislocation fluctuated between 0.25 and 4 cm.; it amounted to 2.11 cm. on the average. This displacement calls forth transverse location of the heart and a kink near the root of the large vessels. These changes become very marked during the eighth month of pregnancy. They contribute toward increased cardiac activity, but do not per se cause heart embarrassment. Adventitious heart sounds during pregnancy are due to the kinking of the pulmonary artery. MILL.

Experimental Glycosuria in Pregnant and Non-Pregnant Women—
F. JAEGER, *Zeitschr. f. Geburtshilfe u. Gynäkologie*, Vol. LXXIV, Nos. 2 and 3.

Examination of the sugar excretion after epinephrin injections and the ingestion of dextrose and levulose. In pregnant women the ability to assimilate sugar is diminished. MILL.

Premature Labor in Cases of Excessive Vomiting and Heart Disease—
O. TUSSZKAI, *Med. Press and Circular* (London), Nov., 1913.

Pulse rate and rhythm vary when the body is in different positions. This variation disappears in cases of hypertrophy of the heart and the latter condition is common in pregnant women. In several pregnant women suffering from heart disease, author states that when want of compensation began, the variation in the pulse which had previously disappeared, owing to cardiac hypertrophy, reappeared as a sign of subsequent dilatation. Heart disease will rarely indicate the induction of labor, for experience has shown that most of such complications do not prejudice labor, but it must not be forgotten that pregnancy may be very prejudicial to a woman who has already had a cardiac affection, and that no small number of pregnant women with cardiac trouble die suddenly during pregnancy, labor and the puerperium, the heart disease being the cause of death. SACHS.

Hippuric Acid in the Urine of Nurslings—S. AMBERG and H. F. HELMHOLTZ,
Zeitschr. f. Kinderheilkunde, Vol. IX, No. 1.

In the urine of nurslings there occurs constantly a certain amount of hippuric acid. The hippuric acid nitrogen amounts to less than 1 per cent. of the total urinary nitrogen. MILL.

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A PRACTICAL TREATISE ON MEDICAL DIAGNOSIS for Students and Physicians. By JOHN H. MUSSER, M.D., LL.D., Late Professor of Clinical Medicine in the University of Pennsylvania; Physician to the Philadelphia and Presbyterian Hospitals; President of the American Medical Association, etc. Sixth Edition, Revised. By John H. Musser, Jr., B.S., M.D., Instructor in Medicine in the University of Pennsylvania; Assistant Physician to the Philadelphia Hospital; Assistant Physician and Physician to the Medical Dispensary of the Presbyterian Hospital; Physician to the Medical Dispensary of the Hospital of the University of Pennsylvania. Illustrated with 196 Engravings and 27 Colored Plates. Philadelphia and New York, Lea and Febiger, 1913.

The sixth edition of Musser's Medical Diagnosis is an up to the minute book. The younger Musser is to be congratulated on having made a genuine revision of his father's masterly work. The sections on laboratory and physical diagnosis have been entirely rewritten, and new sections been added on disturbances of the internal secretions, and chapters on the various functional tests of organic efficiency. This book is one of the best, complete clinical expositions on medical diagnosis. It well deserves its extensive popularity. L. B. S.

VICIOUS CIRCLES OF DISEASE. By JAMIESON B. HURRY, M.A., M.D. (Cantab.), Ex-President Reading Pathological Society. With Illustrations. Second and Enlarged Edition. Philadelphia, P. Blakiston's Son and Co., 1913.

The second edition of Hurry's Vicious Circles in Disease is worthy of an exhaustive study. If for no other reason than to gain a clear conception of pathological physiology in many common diseases, the perusal of the book will well repay the reader. The author is direct and accurate in his statements, and an understanding of the book's main idea may be readily gained. The only adverse criticism the reviewer feels inclined to make is the tendency of Dr. Hurry to extend his vicious circles to cover too great a variety of conditions. The publishers deserve praise for the exceptional artistic manner in which the book is printed and bound. L. B. S.

AN INTRODUCTION TO THE STUDY OF INFECTION AND IMMUNITY. Including Chapters on Serum Therapy, Vaccine Therapy, Chemotherapy and Serum Diagnosis. For Students and Practitioners. By CHARLES E. SIMON, B.A., M.D., Professor of Clinical Pathology and Experimental Medicine at the College of Physicians and Surgeons; Pathologist of the Union Protestant Infirmary and the Hospital for the Women of Maryland; Clinical Pathologist to the Mercy Hospital of Baltimore, Maryland. Second Edition, Revised and Enlarged. Illustrated. Philadelphia and New York, Lea and Febiger, 1913.

The first edition of this work has been a wonderful success. The author has brought his work up to date by the incorporation of notable pertaining achievements of the past year, such as auto- and normal serum therapy, the chemotherapy of pneumococcus infections and of cancer, the serum diagnosis of pregnancy, etc.

In this work the author has clarified a complex subject in an admirable manner.

L. B. S.

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Special Articles

LIVING PATHOLOGY

By JOHN B. DEAVER

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The natural history of disease embraces our knowledge of its progression, either to restitution to the normal, or to the creation of dead pathology. Living pathology is the science of disease processes in motion while dead pathology takes cognizance only of terminal tissue changes. The structural changes associated with terminal pathology differ necessarily from these same changes in their incipency, and therefore the modifications in functions engendered by disease can only be interpreted by one who is familiar with the pathology of the living. It follows that rational treatment depends upon the correct understanding of the symptoms which arise from living pathological processes.

The charred ruins of a building offer a conception of the magnitude of the fire analogous to that which dead pathology affords of the clinical course of the underlying disease. Too exclusive devotion to the pathology of the dead brings misconceptions of the disturbances of function and structure in the early stages of disease, with resultant errors in diagnosis, prognosis and treatment. No

abnormality of the living tissue fails to express its presence in terms unmistakable to the mind made alert by experience with the pathology of the living. A symptomatology therefore that is based on the clinical expression of terminal changes bears the stamp of neglect of the language of these processes in their initiative stages. The revelations of the mortuary slab, however, in the early developmental period of modern medicine necessitated revision of that natural history of disease which had been founded on the ignorance and superstition of ancient practices, and the refinement of clinical medicine under the stimulus of pathological study in the dead marks the turning point in the development of modern practice. We must look upon living pathology as an evolutionary product of this era and ascribe its parentage to those whose labors combined to instill the spirit of science into medicine. This spirit which has been brooding on the waters through many centuries, attained its highest perfection in living pathology with the development of modern surgical technic. With the introduction of asepsis and anesthesia operative investigation of diseased structures within the body cavity became a simple matter. Symptoms which could not be accounted for before were now ascribed to the early tissue changes in disease whose terminal pathology had long been known. It became evident that the latter changes had passed through transitional periods or stages when surgical cure was a comparatively simple matter. We should therefore as practical physicians concern ourselves with the primary pathological processes in the living, for in many, indeed in the majority of surgical diseases, treatment is of avail only in the beginning of the disease. In that transitional period characterized by symptoms which we speak of as classical, the period which marks the transition from the pathology of the living to the pathology of the dead, the problems of diagnosis are easily solved, but the price of this ease of solution is too often dis-solution. Too many lives are sacrificed because the symptoms of living pathology remain unintelligible to the physician who recognizes only that terminal stage when the hope of operative cure is in vain. In seeking for illustration of the toll which an ignorance of living pathology demands in dealing with surgical conditions, we can find no better example than that of malignant tumors. Let us consider therefore the contributions of our modern knowledge to the cure of this universal disease.

The first principles of neoplastic processes were formulated by John Hunter when he first observed, and drew attention to, the resemblance which exists between normal tissue elements and the constituent cells of tumors. A few years later, Broussias startled the scientific world with the statement that chronic inflammation consequent upon organic irritation is the underlying cause of all tumor formations. This most important chapter of the living pathology of malignancy was forgotten with the introduction of the cell doctrine in 1838. In the succeeding twenty years, the development of the science of living pathology was such that Virchow was enabled to formulate the now famous dictum "all cells from a cell" and this, with the adoption of organic irritation as the most important predisposing cause of tumor formation, represents practically the sum total of our knowledge of tumor disease at the present time. We know that the constituent cells of tumors are prototypes of the normal cells whence the tumor grows. It follows that all neoplastic diseases are primarily localized, and that, as a corollary, there must be a time in the life history of every new growth when surgery can effect a cure, providing of course that such growth involves an approachable viscus. The transitional periods in the ceaseless march of malignancy to a dead pathology are productive of symptoms that confirm the malignant nature of the neoplasm, but confirm also the impossibility of operative cure. The cancer problem seems to be a biological one, a problem of abnormal cell growth into which a large number of causative factors enter. The initial event in this sequence is a premalignant tissue change. Living pathology shows that these changes vary, not alone in different areas of the body, but that a variety of widely dissimilar changes in the same organ or tissue have the potentiality of malignancy. It teaches furthermore, that precancerous conditions are dependent upon irritants, either external or internal in origin. The determining cause is believed by many students of the pathology of the living to be microbic in nature. This with many other problems remains for future solution although the work of Rous in experimental sarcoma seems to indicate that a filterable living virus is the cause of certain types of malignant connective tissue tumors. It is our present duty to remember, however, that malignancy in all of its protean forms is an evidence of antecedent benignancy—that benignancy in the great majority of in-

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stances means future malignancy. In dealing with apparently benign lesions therefore, we must not indulge ourselves in the faith of their continued benignancy, but rather look upon such cases as fortunate opportunities to avert the danger of malignant transformation by immediate excision. The results of malignant tumor-surgery are absolutely dependent upon the knowledge of living pathology on the part of the family doctor who sees these cases in their early stages.

There is an equal possibility of malignant degeneration in benign lesions of both internal and external origin. All inflammatory lesions especially those consequent upon chronic forms of irritation are prone to undergo carcinomatous change. It is a matter of common knowledge that gall-stones are the frequent precursors of cancer of the gall-bladder, yet the significance of this relationship has been most strikingly demonstrated in a recent article by Mayo in which he states, that the patient with irritating gall-stones has about eight times the chance of dying of malignancy as he would have in their removal. In the primarily benign neoplastic and inflammatory diseases of the abdominal viscera, the danger of malignancy is so imminent, that this fact alone justifies operation in all long standing diseases however obscure the diagnosis may be. You are doubtless familiar with the recent work of Young in prostatic cancer, of Mayo in cancer of the stomach, and with the work of other pathologists of the living and we need not multiply examples in illustration of this well recognized tendency of benign lesions of the internal organs to undergo malignant transformation. As regards superficial cancers, it is my belief that every growth of this kind is preceded by a benign lesion, and this contention is supported by Czerny, who states, that he has never seen a case of carcinoma of the lower extremity that did not proceed from a simple lesion. The final point to which I would call your attention in connection with pre-malignant influences is that of traumatic injury as a factor in the causation of cancer. Living pathology teaches that the influence of trauma varies among other things, with the type of the injury, the area involved, and the age of the patient. Thus an intensive injury to the extremity of a young person is more likely to be followed by a sarcomatous growth than is an intensive injury to the breast of a young woman. On the other hand an intensive injury to the

breast of a young woman is more likely to be followed by sarcoma than by carcinoma. After the thirty-fifth year of life, the reverse is true. Theilhaber has shown that these clinical observations have a rational basis in the living pathology of the disease. Thus carcinoma is preceded by atrophic changes of the tissues, a condition established in advancing age and after chronic forms of irritation. Sarcoma on the other hand is associated with hyperemic tissue states, a condition conduced to by youth and injuries of an intensive nature. Rous has confirmed the latter assertion experimentally by proving beyond question that proliferative connective tissue reaction is a necessary factor in the artificial propagation of sarcoma in experimental animals. You will ask, what good has come from these advanced ideas of the living pathology of tumor diseases. In answer I may state that during the past five years we have operated upon twice as many cases of chronic cystic mastitis as during the five preceding years. This condition is the common precursor of carcinoma of the breast, and while the total number of cases of mammary diseases operated upon has increased somewhat, there has been a disproportionate increase in the number of benign tumors operated upon. The same holds true for other viscera, not alone in our experience but in that of other surgeons. This means that the general practitioner is becoming a living pathologist for he no longer awaits the appearance of classical symptoms of malignancy, but insists upon operation when total excision and therefore cure is possible.

An organ or tissue which labors under the stress of a toxemia produces abnormal chemical substances. In many instances these products permit of complete analysis, and as in the case of antidiphtheritic serum, this analysis has furnished the means of rational treatment. In our disappointment with many of the various sera and vaccines and similar biologic products, we too often lose sight of the fact that this knowledge, limited as it undoubtedly is, has served to create the surgery which we speak of with pardonable pride as modern. At the same time it is the limitations in our knowledge of these same biochemical processes that obstructs the upward way to surgical perfection. In this connection the operative treatment of chronic intestinal stasis becomes of interest. For centuries the colon has been looked upon as the source of the majority of human ills. Each succeeding generation has given an alias

to the condition which the present one terms chronic intestinal toxemia, and incidentally proposed some purgative method of relieving the countless ills arising therefrom.

With the advent of living pathology, a rational basis for this toxic condition was found in an abundant microorganic life resident in the gut-tube, and the soluble toxines produced by these bacteria gave reason for the systemic effects of chronic constipation. Metchnikoff's belief that the arterial changes of senility are dependent upon the absorbed toxines came in logical sequence to these discoveries. Immediately it was suggested to circumvent the advent of senile changes by surgical relief of its toxemic cause. You would be led to believe from the writings of enthusiasts in this line of work that "the master knot of human fate" may be unraveled by surgical alteration of the direction of the fecal current. We must therefore familiarize ourselves with the limitations, rather indications, for surgical application of the advanced ideas on intestinal toxemia, for there is a decided tendency to perform operations for the relief of this condition which we believe are unjustifiable. In our experience the indications for so radical and hazardous a surgical procedure as excision of the colon rarely exists in intestinal stasis, and the purpose of the simpler operations, such as short-circuiting or ileo-sigmoidostomy, which throws the large bowel out of commission, is defeated by regurgitation of the feces into the proximal loop with impaction, resulting in a condition far more favorable to toxemia than that which existed prior to operation. For these reasons we look with little favor on the surgical treatment of intestinal toxemia resulting from stasis except when such stasis is dependent upon a removable type of mechanical obstruction. The diagnostic use of the skiagraph has added materially to our knowledge of these conditions, direct observation in the living has enlightened us as to the rôle played by peritoneal bands and folds in its production, which latter I believe are of inflammatory origin and not congenital, as is held by some; and finally, our understanding of the physiology and bacteriology of the large intestine has been broadened by these investigations in the field of living pathology. The best means of their practical application however remains for future solution.

Surgical diseases in general express the powers with which Nature has endowed her minutest forms of life. The majority of these

conditions imply failure on the part of the body to hold in abeyance the natural destructive tendencies of pathogenic bacteria. It is evident that removal of the infectious foci during the quiescent stage relieves the individual of the danger of their future activity. From this we have developed prophylactic surgery which is in its infancy, but lends the hope of marvelous development in the near future. And finally there remains that which concerns us most, the correction of those defects and deformities which remain as sequelæ of infectious processes, especially of the pelvico-abdominal viscera. The cavity of the mouth represents the most important portal of entry, not only for infections causing systemic disease, but also we believe for those causing inflammatory diseases of certain of the abdominal organs.

The prophylactic surgery of these conditions had its inception in the discovery that the tonsils when inflamed result, not alone in infection of adjacent lymphatics, but also in metastatic infections of distant structures, especially of the serous membranes. We know that practically all types of non-traumatic inflammation of the joints are metastatic manifestations of primary infection in some other part of the body. These observations have been extended to include the teeth, the accessory sinuses, and the middle ear, as well as other organs, of which, the accessory sexual glands have lately claimed most attention. The prophylaxis of these secondary manifestations is simply in anticipation of the living pathology which so often ensues from foci of latent infection. We are especially interested however in abdominal disease. What relationship if any have these foci to disease of the abdominal viscera? It was long believed that the acid chyme destroys the majority of ingested bacteria. The living pathology of the gastric contents has shown the fallacy of this view. In the Mayo clinic, the stomach contents of 87 per cent. of 2406 different individuals suffering with gastric symptoms were found to contain bacteria. Hartzell, Steadman and others look upon oral infection as the cause of gastritis, which latter may eventuate in ulcer and even carcinoma. It is not only conceivable, but also very likely, that appendicitis, cholecystitis and other intra-abdominal diseases may be due to infection from this same source, and every precaution should therefore be taken to prevent them. On the other hand we so often fail to recognize the presence of intra-ab-

dominal living pathology that it would seem futile to teach the principles of prophylaxis of conditions which are fully appreciated only by the few who have seen the mysteries of functional gastrointestinal derangement dispelled by surgical exposure of the products of antecedent, latent or active infections. The revelations of living pathology in these diseases have dissipated the uncertainties of diagnosis in the establishment of definite rules for exploratory operation. The progressive physician no longer awaits the appearance of terminal symptoms, but invokes the aid of surgery in dispelling the uncertainty which so often associates itself with the inceptive stage of so many intra-abdominal diseases. Those of you who come face to face with the difficult problem of abdominal diagnosis will bear a lighter burden if you remember the advice of Moynihan, when he says "I would urge upon all those engaged in practice the desirability of following their patients to the operating table whenever the opportunity occurs. The lessons there to be learnt will in practice be of a value above all reckoning and the interest in the daily work will thereby be quickened to an unaccustomed degree." What I desire to impress upon you is the fact that the clinical symptomatology of most abdominal diseases is nature's expression of destructive changes in the tissues caused by pathogenic bacteria, and the functional derangements of the abdominal viscera as clinical entities are so rare that the best interests of our patients would be served if these conditions were entirely forgotten by medical practitioners. The internist is loathe to part with these idols which have served his diagnostic purpose for so long, but it is only by attention to pathology of the living that he will be spared a repetition of those errors in diagnosis which are the results of a clinical medicine founded on dead pathology.

Difficulties in diagnosis of upper abdominal diseases are engendered largely by the close anatomical relationship of the important organs of that region. Functional disturbances of the stomach more often express lesions of the related viscera than of this important organ itself, and in the absence of definite localizing symptoms it is impossible to determine by clinical examination alone the location and nature of the disease process. Safer by far is the physician who recognizes the language common to the living pathology of these viscera, than he who attempts a differential diagnosis and at-

tributes the symptoms to functional derangements. I refer especially to that large class of patients who suffer from so-called dyspepsia. Dyspepsia is gastric lamentation for tissue which has been destroyed within the abdominal cavity.

In most of these cases we must rely upon the clinical history for diagnostic aid, and this frequently lacks that definition which permits of reasonable suspicion of involvement of any particular viscus, and certainly not of any specific lesion of that viscus. In a few instances, the history of some impressive symptom indicates the location of the disease with a fair degree of accuracy. Thus a typical history of duodenal hunger pain, of gall-stone colic followed by jaundice, or of recurring attacks of hematemesis, we can be reasonably sure of the diagnosis. It is our experience, however, that the variations in the symptom-complexes of upper abdominal diseases are so frequent and misleading that the best interests of the patients would be served if we divided cases of this kind into operative and non-operative groups at once, rather than to wait in the obscure cases until something occurs to confirm our suspicion of its serious nature.

The operative group will increase in proportion to our added experience in the living pathology of upper abdominal disease. It takes that moral courage borne of conviction to advise operation in a patient in whom the symptoms are obscure, the suffering slight. This conviction only comes to those who have frequent opportunity to witness the actual pathology in the living. And not only is experience in the early living pathology of upper abdominal disease necessary to impress us with the hopelessness of medical treatment, but we must familiarize ourselves with the various pathological stages through which these disease processes pass to the creation of dead pathology. We learn in this wise that the same symptoms are associated with the inceptive and terminal stages of disease. The physician who is possessed of this knowledge looks with apprehension upon the dyspeptic syndrome—he sees with larger other eyes than his less experienced fellow practitioner. The history of vague epigastric pain—of acid eructations—the belching of gas—distension after meals and other upper abdominal symptoms which send the average doctor in search of *nux vomica* and soda, brings to his mind the picture of living pathology. The retina of his mind's eye

focuses the images of past experience—it is the image of gall-stones, the malignant gall-bladder, gastric ulcer and carcinoma, duodenal ulcer, the hard interstitial pancreas, perhaps a chronically inflamed appendix, each of which he knows may be associated with identical symptoms.

The necessity of operation is assured the patient with the conviction that within the confines of the upper abdomen there is a living pathological process at work, the natural tendency of which is either to chronic invalidism or to death. These are the principles which must eventually dominate medical thought in diseases of the upper abdominal viscera. The progressive surgeon of to-day indulges the hope of that millenium when the symptoms of upper abdominal disease will create in the mind of every practitioner of medicine the picture of living pathology.

The modern principles of intra-abdominal surgery are founded on a by-product dropped from the seething laboratory of the brain of Lawson Tait. When Lister opened the doors of surgical possibility with the golden key of Pasteur's discoveries, the new science of living pathology awaited but the mastertouch of Tait to make it our common heritage. An exponent of scientific accuracy in the study of diseases of the female pelvic organs, his contributions to this branch of surgery are monumental in the annals of living pathology. By observing disease processes through the open laparotomy wound, Tait was able to solve the riddle of broad ligament hematomas which he discovered were due to extra-uterine pregnancy. In like manner Tait showed that pelvic cellulitis in the majority of instances is merely a stage in the progress of living pathology, primarily caused by infection of the Fallopian tubes. This early application of the science of living pathology was soon extended to include, first, the appendix, and finally the remaining abdominal viscera. American surgeons, including Price of Philadelphia and Fitz of Boston, became able exponents of the work borrowed from Tait. The one great contribution to living pathology by a fellow-countryman is the modern treatment of acute appendicitis. We are forever indebted to Reginald Fitz for the correct interpretation of inflammatory processes in the right iliac fossa. Physicians for centuries had noted in their studies of the pathology of the dead, the methods employed by Nature in localization of inflammatory products produced

in this region, but it remained for Fitz to show that these products represent progressive steps in the living pathology of acute pyogenic infection of the appendix.

By early operation visual demonstration of the catarrhal, ulcerative, gangrenous and perforative stages of appendicitis was made, and in a few years the clinical symptomatology and operative treatment of this condition became recognized throughout the world.

The contributions of living pathology to the perfection of modern surgery are legion, but those to which we have referred will serve, I trust, to illustrate the "upward looking and the light" which the surgery of the immediate future holds in store. Nutriment and environment are factors as constant in the progress of the surgical world as in the world of our material being—"the angels grow white looking at the throne." The nutriment you may absorb from the writings of leaders in the scientific advancement of living pathology, the environment, by standing at the right hand of the surgeon who dispels the mysteries and reveals the truth. In this manner alone can the individual, and finally the profession attain that broad conception of living pathological processes without which the symptoms arising therefrom must be without meaning. In this reciprocity of professional being our fellows will ascend with us to the highest levels of scientific medicine, and this expresses fulfillment of the revelations of living pathology.

FUNDAMENTAL CONSIDERATIONS IN THE DIFFERENTIATION OF GASTRIC NEUROSIS FROM ORGANIC ABDOMINAL DISEASE.

By H. Z. GIFFIN

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In a day of the aggressive development of surgery clinical diagnosis must know more definitely its reason for any show of conservatism. An improper conservatism has often conserved the disease rather than the patient. Every history of gastric disorder may mean the incipency of some serious organic disease and all the burden of careful observation falls on the physician when he arrives

at a decision to advise against surgical treatment. A mistake of this character assumes its most striking and serious proportions when a carcinoma of the stomach has been tentatively diagnosed as gastric neurosis.

On the other hand, and it is this aspect of the subject that I wish to emphasize, much needless and often harmful surgical treatment has been carried out on patients who were very plainly neurasthenic in constitution. Those observers who have had a large experience in nervous diseases have always recognized this fact and have never countenanced it. Meanwhile many of these very specialists in nervous diseases have been so ultra-conservative with regard to the recognition of gastric and duodenal ulcer and those reflex types of indigestion caused by disease of the gall-bladder and appendix that some surgeons have been made bold as a consequence. There have been those on both sides, however, who, by reason of an especial sanity, have maintained the mean position. They have realized the harmful consequences to medical and surgical progress that would follow because of mistaken diagnoses and misdirected treatment; for whatever is harmful to medical and surgical progress as a whole is harmful to the good of the greatest number.

With regard to malignancy it has been learned that the unsuccessful attempt to lengthen the life of an individual a few months by some surgical procedure may lead several of his neighbors to delay during a curable stage; in view of this fact even the successful attempt to lengthen life may at times not be justifiable. It has not, however been sufficiently appreciated that a neurasthenic individual who complains more after operation than he did before may prejudice literally hundreds against what might be to them a beneficent treatment.

It is therefore essential that the greatest care be exercised in differentiating gastric neuroses from organic surgical diseases. With this, there will also result a greater efficiency in recognizing the truly surgical conditions so that some serious affection may be even less likely to be overlooked.

In connection with the diagnosis of gastric neurosis certain fundamental considerations are essential; considerations which it may be of interest to classify and discuss.

The first of these has to do with the distribution and physiology

of the sympathetic and the cranio-sacral autonomic systems.^{1,2} Fibers from the autonomic system are distributed to the eye, throat, heart, lungs, stomach, intestines, and other abdominal viscera and the genital organs. This distribution accounts for the symptomatology in a great many instances. Peculiar throat complaints, salivation, hot flushes, palpitation, cardiac distress, a variety of abdominal symptoms, pelvic hypersensitiveness and anal spasm in addition to all of those features which make up the picture of a general neurosis are consequently associated with gastric symptoms. In those patients complaining of indigestion, symptoms of hypersensitiveness and instability of the cerebrospinal nervous system and variations in the tonus of the autonomic system may in fact clear the diagnosis. It is the rarest incident to obtain a clear-cut history of gastric disorder which can be properly diagnosed as gastric neurosis without evidences also of a more general neurosis. It is quite generally recognized that a majority of the cases of neurasthenia are of the congenital asthenic type;^{3,4} consequently the family history and the entire personal history of the patient must be considered as a whole in the diagnostic consideration of a given case.

The second consideration which may be of assistance in the diagnosis of these cases has to do with the distinction between a functional disorder and a neurosis.⁵ It is remembered that the irregular functional type of indigestion need not be secondary to a neurosis. Hypersecretion, hypermotility, pylorospasm and gastrospasm are functional disorders but may not be due to a neurosis. Indigestion associated with tuberculosis, anemia, nephritis, or cirrhosis of the liver is functional but not neurotic. The vomiting associated with brain tumor is a reflex vomiting and may be regarded as functional but not neurotic. Consequently it would seem to be a safer plan in connection with the diagnosis of a given case to regard an indigestion which presents those irregular symptoms commonly considered as of the functional type as a secondary indigestion and then to proceed by elimination to demonstrate that it is secondary only to a neurosis.

The third consideration would emphasize the importance of variability in the diagnosis of abdominal neuroses. By this is meant both variability in the story that the patient tells, a variability in the patient's story from day to day and a variability in the symptoms from

time to time. In a case of gastric neurosis it is a rare incident to obtain a history of recurring indigestion which maintains a constant type of symptoms. The gastric neuroses so commonly described as either sensory, motor or secretory in character are seen from a practical standpoint to be possible of no such classification. There is always a combination of these types of disorders. When a constant type is approached one's suspicions of organic disease are always aroused. It was long held that but one type of gastric neurosis gave a constantly recurring picture and that was the type supposed to be associated with hyperchlorhydria. But the degree of acidity is a variable finding, and we now know that the recurring history of burning pain, sour eructations, and relief from soda, once regarded as often due to a simple hyperchlorhydria, practically always means ulcer or some type of organic reflex disorder secondary to an abdominal lesion. Consequently the only remaining constant type has been eliminated and variability assumes even greater importance in the diagnosis of abdominal neuroses.

By way of comparison upon this question of variability, allow me to review the more constant types of organic abdominal disease. In a study of all the cases of gastric and duodenal ulcer that were operated on in the Mayo Clinic between 1906 and 1911 inclusive (a total of 816 cases) Graham⁶ arrives at many valuable conclusions. Chief of these is the evidence concerning periodicity, pain, and pain relief. Pain or severe gnawing distress was noted in 95 per cent. of the cases, relief of pain by food in 76 per cent., while a periodicity in the attacks of indigestion with intermissions over a term of years occurred in 85 per cent. of the cases. That is, a periodicity of attacks of indigestion with intervals of freedom extending over a number of years is almost constant in the duodenal and pyloric types of ulcer before complications are too far advanced. Consider in addition to this the characteristics of the indigestion, in which pain and very sour regurgitation come regularly at a certain interval after food, with more or less relief from food or alkalis and the diagnosis of ulcer, save in the exceptional case, is seen to be much simplified. Moreover the symptoms assume a constant type. Compare this with the variability of gastric neurosis in respect to periodicity, pain and pain relief and the distinction is not difficult save in a small percentage of instances. Hunger-pain with food-relief almost never

occurs in gastric neurosis. Conversely if there be no history of hunger-pain the probability of duodenal ulcer being present is small.

In ulcer of the stomach proper there is a certain degree of irregularity which does not occur in duodenal ulcer. The symptoms are apt to be continuous for longer periods, remissions rather than free intervals occur, pain may begin soon after meals, often from one-half to one hour, and may disappear before the next meal; relief from taking food is consequently of shorter duration. Even here, however, there is definite pain and usually sour regurgitation, and these will ordinarily distinguish the condition from gastric neurosis in which the patient may give other evidences of an instable nervous system and is much more apt to complain of heaviness, fullness, abdominal pulsation, nausea, and bitter eructations, foul taste and coated tongue. In fact it may be stated here that the very bad condition of the mouth and tongue with their foulness, fissures, and deposits are much more commonly seen in connection with neurotic conditions than in ulcer and cancer, and suggest the possibility of a chemical basis for the disorder.

Again difficulty is encountered in the differentiation from gastric neurosis of those types of indigestion due to chronic colicless gall-bladder disease and chronic appendicitis without acute exacerbations. Here there is apt to be a wide irregularity of symptoms, the time of pain with relation to food intake is likely to vary from day to day. Food ease may come one day and not the next. The attacks are not clear-cut because the symptoms are dependent on the behavior of a distant lesion. Some of the cases, however, will give a history which cannot be distinguished from that of ulcer, but the extreme variability of neurasthenia is generally lacking. There is also an absence of neuralgias, headache, palpitation, pelvic hypersensitiveness, weakness and easy tiring.

It is whenever any of these lesions, that is, gastric or duodenal ulcer, gall-bladder disease or appendiceal disease, occur in a congenitally neurasthenic individual that the greatest difficulty of all is encountered. The fact can never be lost sight of that a patient with neurasthenia may also have a definite organic lesion. Consequently one may not yield to the temptation of too quickly concluding that a patient is neurotic only. Fortunately in most of the cases of this type, two definite histories stand out prominently, one the neurotic

picture and the other the picture of the organic disease present. That is, the history can be divided rather sharply into two distinct groups of symptoms. In other instances the symptoms of organic disease rather strangely relegate the neurotic symptoms to the background. "I used to be nervous, but these pains are different and much worse than my former ones" is the usual story.

It would appear then that the most important considerations leading to a diagnosis of gastric neurosis are:—(1) The existence of extreme variations in the type and course of the indigestion; (2) the elimination of definite evidence of a lesion which might cause a reflex functional type of indigestion; and (3) the presence of symptoms pointing to an instable or hypersensitive nervous system.

A fourth and very important consideration in a study of indefinite types of abdominal disease is that of the findings upon examination value of the Röntgen-ray in the cases which came to operation during 1913 in the Mayo Clinic was 93 per cent. for carcinoma of the stomach, 83 per cent. for gastric ulcer and 50 per cent. for duodenal ulcer. These statistics, of course, could not include a reckoning on those cases which never came to operation. One can quite safely conclude, however, that the findings upon fluoroscopic examination of the gastrointestinal tract by the Röntgen-ray. The diagnostic of the gastrointestinal tract are already demonstrated to be of very definite assistance, providing such examinations have been carried out by an experienced operator in a fearless manner.

The diagnosis of duodenal ulcer is usually quite definite upon a review of the clinical history only. The history of cancer, on the other hand, may be mistaken for a functional type of indigestion and may even be considered to be secondary to a neurosis. In cancer, however, the chronicity of the present complaint is usually lacking, there is a short history of a new and different character and Röntgen examination gives a large measure of assistance. The practical value of the Röntgen examination is more conspicuous, however, in the differentiation of ulcer of the stomach proper because here one obtains an irregular history frequently suggesting a reflex, functional or a neurotic type of indigestion and in these patients there is, as a diagnostic aid, a 83 per cent. value in the Röntgen examination as based on cases coming to operation.

The mental attitude of the patient, if properly analyzed, is an

aid to correct diagnosis in cases of abdominal neurosis. There is a tone of despair in his complaints, he would rather die than exist as he is; there is a wide fluctuation in his sense of well being; he is up one day and down the next; he is keen for an excessive amount of work at one time and mentally inert at another. There would almost seem to be some temporary cerebral abnormality as well as an affection of the lower centers. There probably is a certain degree of psycho neurosis with every neurasthenia.

Chronic starvation often completes the vicious circle in cases of gastric neurosis. These patients have no appetite and, if they eat, they either vomit immediately or the food lies so heavily and causes such a feeling of fullness and bloating that the condition is to them intolerable. This may be partly due to the congenital visceroptosis that is often an anatomic attribute of the congenitally neurasthenic individual. It is undoubtedly also due to a hypersensitiveness of the stomach. From a therapeutic standpoint the recognition of chronic starvation is of the greatest importance because if ulcer be diagnosed by mistake the patient may either be operated upon or dieted unnecessarily when in reality he is suffering from neurasthenia plus the effect of starvation. Forced feeding brings about improvement in the general condition and consequently effects a more or less complete disappearance of the gastric symptoms.

STATISTICAL*

The evidence in corroboration of one's opinion concerning the diagnosis of gastric neurosis comes from the acceptance of, first, the experience of those physicians who have had most to do with a study of nervous diseases; second, the experience of surgeons with patients who have been operated on in different clinics from one even to a dozen times without improvement, often with positive harm; and, third, the fact that large numbers of patients with the accepted symptoms of abdominal neurosis have never developed organic disease.

It may be of interest to review in this connection in a general way a group of statistics bearing on this subject from the files of the Mayo Clinic. During the year 1913, 58 resections were done

*I am indebted to Ethan Flagg Butler for assistance in reviewing case histories.

for carcinoma of the stomach. In this group there were two patients who gave histories which might have been mistaken for gastric neurosis. These patients presented a very irregular symptomatology extending over a period of years and blurred by the description of many vague and bizarre complaints. Fortunately the fluoroscopic examinations prevented error. In one instance the Röntgen examination disclosed a filling defect in the pars pylorica and in the other case a moderate pyloric obstruction was demonstrated. During the year 1913 we have been able to find one case in which, while a tentative diagnosis of gastric neurosis was made, the patient developed carcinoma of the stomach.

In a review of 100 cases in which gall-stones were removed at operation, 14 histories showed a neurotic tinge. These are of two groups: First, the majority which gave both a clear-cut history of neurosis and in addition a clear-cut history of gall-bladder disease; second, those in which the symptoms were irregular and confusing. In these it is noteworthy that in the type of indigestion the complaint of an excessive formation of gas and the eructation of large amounts of gas was most prominent and that upon physical examination there was localized tenderness and rigidity in contradistinction to that general abdominal hypersensitiveness so commonly observed in abdominal neuroses.

In a series of 1000 consecutive recent cases of neurasthenia in which a prominent gastric symptomatology was presented, we found that 199 had been previously operated upon, some of them in this clinic, in an attempt to relieve these symptoms and that although there may have been a pathologic lesion present at the time of operation, no relief of their principal complaints had resulted. Of these 199 patients, 175 had had one operation, 16 had had two operations, 7 had had three operations and one had had four operations.

These operations were chiefly upon the appendix, the pelvic organs and the gall-bladder.

Patients who had 1 operation—175.

Appendectomies (negative exploration 37) (no exploration 63)	100
Operations on pelvic organs (chiefly on the ovaries).....	50
Operations on stomach	6
Operations on gall-bladder	11

Operations on kidney (chiefly for movable kidney).....	5
Miscellaneous	3

It is beyond the scope of this paper to discuss these findings in detail. It may be stated, however, that the evidences of a general neurosis were so prominent and the signs of local disease so indefinite that these cases have been classed as neurasthenia.

Patients who had 2 operations—16.

Primary operation, appendectomy	13
Primary operation, pelvic	2
Primary operation, gall-bladder	1

The subsequent operations in these cases were for adhesions, painful scar, oophorectomy, visceroptosis, drainage of the gall-bladder, etc.

Patients who had 3 operations—7.

In this group there was a considerable variety in the types of the operations. In 2 cases, the operations were entirely upon the stomach; in 5, on the gall-bladder, appendix, kidney, pelvis and for adhesions.

One Patient who had 4 Operations.

First, movable kidney; second, gastroenterostomy; third, "entero-anastomosis" and oophorectomy; fourth, gastroenterostomy undone and appendectomy.

In addition to these 175, 28 of the 1000 patients had been formerly advised to have an operation for the relief of symptoms which seemed to be so definitely neurotic in their character that surgical treatment seemed to us to be contraindicated.

It would appear in the above tables that the most numerous offenses are committed upon patients with symptoms localized in the region of the appendix.

CONCLUSIONS.

It is the common experience of large surgical clinics that too many patients suffering from various types of abdominal and pelvic neurosis have been advised to undergo surgical treatment and the greatest number of mistakes is apparently made in connection with those cases in which the diagnosis and prognosis should not be difficult. On the other hand, most searching examinations are often required

in cases which, at the first examination, appear to be neurotic in order to avoid the occasional mistake of not recognizing an abdominal lesion.

Cases of gastric neurosis demand a very general kind of consideration. Important general factors which enter into this consideration are (1) the analysis and grouping of those symptoms referable to hypersensitiveness and instability of the nervous system; (2) the careful exclusion of those diseases which, in a reflex manner, so commonly produce an indigestion of the functional type; (3) the realization that variability, both in the story that the patient tells and in the symptoms from time to time, is most important; (4) the application of the Röntgen findings; (5) the recognition of certain psychic elements and (6) a review of all these data in the light of the personal and family history of the patient.

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CARCINOMA OF THE STOMACH WITH ACUTE ONSET. THE IMPORTANCE OF RECOGNIZING EARLY SYMPTOMS OF THE DISEASE

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Carcinoma of the stomach must be diagnosed early if surgery is to be of any assistance in its eradication. What constitutes such a diagnosis should no longer be considered a moot question. A diagnosis cannot be regarded as early if one bases it on the absence of a palpable tumor, as many cases of advanced carcinoma are seen with negative palpatory signs. Nor can one claim that he has recognized the condition early when he can find no evidence of metastasis, as apparent metastases may be lacking and yet the operation may disclose such general involvement that talk of early diagnosis is soon



FIG. II

CARCINOMA OF THE STOMACH WITH ACUTE ONSET

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FIG. I

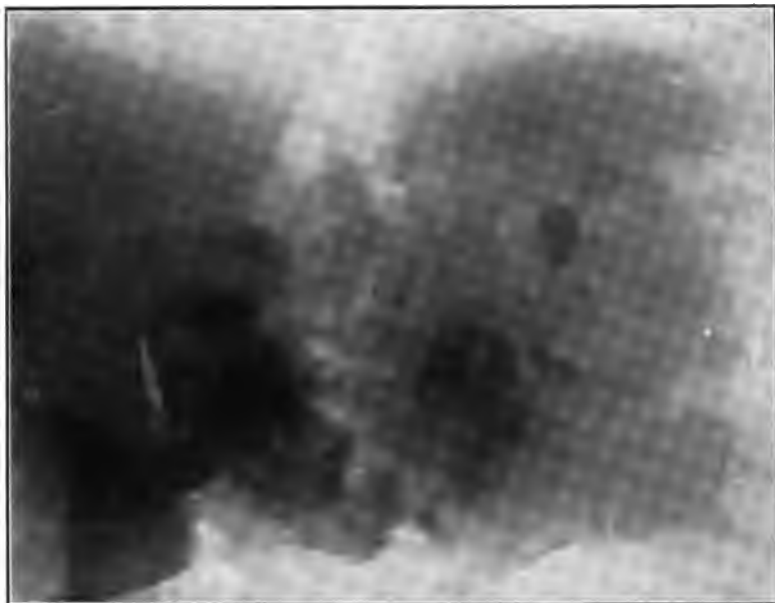


FIG. VI

CARCINOMA OF THE STOMACH WITH ACUTE ONSET

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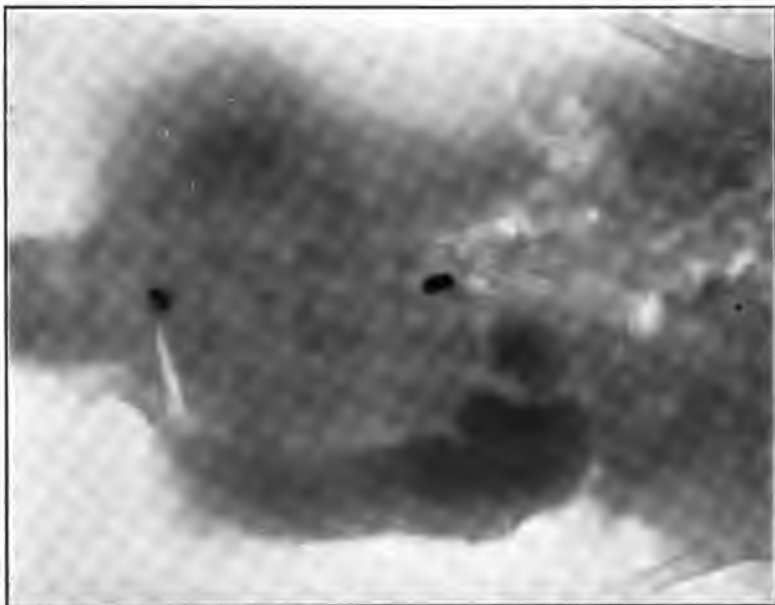


FIG. III



FIG. IV

FIG. V

FIG. VII

CARCINOMA OF THE STOMACH WITH ACUTE ONSET
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hushed. There are two criteria by which a timely diagnosis must be judged, first radical operative procedures must be followed by a lower mortality, and second, there must be shown that the duration of life is prolonged after such operations. Only when these conditions are fulfilled may one be content with his standard.

Having failed to demonstrate that their diagnoses have answered these criteria, surgeons and internists have called to their aid the physiologic chemist. The latter is occupying himself with tests and reactions, and so indefatigably, that each year adds to the full store of those already reported. The number now devised for the early recognition of gastric cancer is sufficient proof that as yet there is no satisfactory test whereby we can judge with exactitude that there is present a beginning carcinoma. Much has been hoped for from a study of the chemistry of cancerous individuals, but unfortunately one test is signaled out, and without comparing it with any other, its usefulness is lauded or condemned. It is, of course, an impossibility to attempt a comparative study of all the cancer reactions, but a step in this direction has been made by Feurer in comparing three so-called important tests, the colloid nitrogen of the urine (Salkowski), the presence of hemolysin in the gastric contents (Grafe-Röhmer) and the presence of a polypeptid splitting ferment (Neubauer and Fischer).

Feurer's conclusions are that, as far as the Salkowski test is concerned, it seems to be a cachexia reaction and not a specific test for carcinoma, the hemolysin test is by no means satisfactory, and the polypeptid (glycyltryptophan) test is practically valueless. He insists that none of these tests furnishes results which harmonize with the other two and that at the best, laboratory tests are but an aid.

There has been so much written about the early diagnosis of carcinoma and so little of practical value has resulted, that internists and surgeons are now feeling hesitancy in writing further on the subject. Even the chemists, once so eager for the fray, seem to be smarting under their repeated defeats, and are not enlisting with such enthusiasm and in such large numbers as before. So do we find Medina, a chemist, offering almost apologetically, "*Un renseignement de plus pour le diagnostic du cancer gastrique,*" and Boas stoutly pleading the cause of *late* diagnosis and urging the abandonment of the futile search for new symptoms, signs and tests.

The present writer has no desire to add to the already replete literature another article suggesting a new sign, but he desires merely to urge the use of those means which are at the disposal of every one, namely, history and examination. He has had under his observation in the past year an unusually large number of cases of cancer, which, owing to the rapidity of their course, one may be justified in terming acute. So indefinite have been the symptoms in certain instances, that one could have scarcely ventured the diagnosis of cancer two months before admission to the hospital, and yet on admission the condition was found to be inoperable. So insidious has been the invasion that in some there has been no aggravation of symptoms until a few days before admission and even in these cases large tumor masses immediately presented themselves on examination. In a great many instances the patients have been treated "outside" (that term which in hospital parlance is unfortunately one of reproach) by physicians who have failed to appreciate the nature of the illness and who have wasted valuable time in their endeavors to correct an obstinate stomach complaint.

It is to the man "outside" that cases of carcinoma first present themselves, and only when he fails to give relief do patients turn to the hospital for help. It is obvious then, that the balance of power in an early diagnosis lies in the general practitioner's hands, and depending on his diagnostic acumen depends the speed with which an operation is undertaken. Too long has one delayed if he waits for the secondary manifestations of cancer (retention, loss of weight, cachexia, tumor formation), and to be productive of any permanent good, the diagnosis must be made in the incubation of the growth, so to speak, and not when it is an unbridled parasite, enjoying its fullest activities at the expense of its host. Tests and objective signs are of little avail in the early stages and often nothing remains to the physicians but a careful history and a painstaking physical examination.

When an individual past forty years of age, who has previously been healthy as far as the stomach is concerned, or who has "been complaining for years of indigestion," begins to complain of gastric trouble of acute onset and persistent duration, or of acute aggravation of previous symptoms, he should be suspected of having cancer. Patients are often uncertain of their previous gastric symptoms,

and remember only a sudden attack which they refer definitely to an indiscretion in eating or drinking, and in an individual of middle life such a history should be regarded with great suspicion. To suspect cancer is one thing, to prove it another, and unfortunately positive proof in the early stages is lacking. I feel strongly, that if a patient past middle life, with a history like that given above, does not improve on proper diet and medication, and continues to complain of unabated or aggravated symptoms, a surgeon should be consulted after a week or two and the advisability of exploratory laparotomy thoughtfully considered.

Surgeons are not unwilling to undertake such operations, although realizing that the latter are not devoid of danger to the patient (mortality 1.6 per cent). Mayo, in a recent paper, says: "The diagnosis of cancer of the stomach cannot often be made early enough to obtain a radical cure by operation, but a diagnosis of some condition of a surgical nature, probably cancer, can be made in time to permit operative interference in more than one third of all cases." Exploratory incision is after all the final test, and while it is a difficult task for the diagnostician to decide which case shall have this performed, still, the internist finds assurance and offer of ready assistance from his surgical confrères. Rodman, in the discussion of Mayo's paper, advises more frequent laparotomies, and Deaver says: "To perform an exploratory operation is practically taking no risk at all." With this favorable attitude on the part of the surgeon it behooves the diagnostician to balance carefully the evidence before him, and to remember, that, although food retention, X-ray and test meals are of some assistance, the early diagnosis if made at all, will be made not on signs of equivocal significance, but on symptoms of undoubted value. One might almost say, in this disease, as in duodenal ulcer, history is everything.

The following cases are striking exemplifications of acute carcinoma, and illustrate the importance of interpreting correctly the earliest symptoms.

Case I. Presbyterian Hospital. History of indigestion for 10 years with acute and persistent aggravation of all symptoms two months before admission.

Charles C. 64. Admitted II, 19, '14. Discharged III, 14, '14. Chief complaint; vomiting, hematemesis.

Patient has been suffering with indigestion for the past 10 years, i.e., he has had a great deal of belching and occasionally some vomiting. Until 2 months ago this condition persisted in a more or less mild degree, when the vomiting became more pronounced. It always occurred from one to 2 hours after meals, but did not take place after every meal. He was able at times to check the vomiting, which appears to be but regurgitation of food, rather than true vomiting. Four weeks ago there was regurgitation after every meal, belching continued and there was some vomiting. The vomitus sometimes contained food which had been eaten as long ago as 2 days before. Liquid food seemed to induce vomiting, while solid food was less apt to upset him. II, 15, '14, patient began to vomit after every meal and could keep nothing on his stomach, and on II, 12, '14, a week before admission, he vomited at least a pint of bright red blood for the first time. Two days before admission, II, 17, '14, he vomited clotted blood twice. Patient has never had any pain. Bowels have been constipated for the past 3 months. Patient has never had blood in the bowel movements, although at times the latter have been very dark in color. There has been some gradual loss of weight in the last 10 years, but in the last 4 months this has been pronounced.

Examination. Emaciated male. The lower portion of the chest is very prominent, and the epigastrium is much retracted. There are no masses and no areas of tenderness. Lower border of stomach 3 cm. above umbilicus (small stomach). II, 19, '14. Blood, Hb. 81 per cent.; R. B. C., 4,630,000; Leuk. 6,430. Stools, occult blood positive. II, 20, '14. Gastric contents. 282 c.c. Total acid, 5; free HCl. 0; Oppler-Boas bacilli, positive; occult blood, positive. X-ray—Carcinoma of stomach.

Operation performed II, 24, '14, by Dr. Hodge. There was a diffuse carcinoma of the stomach involving the pylorus and lesser curvature. Stomach contracted. Metastasis to liver. The stomach was in such a position that a posterior gastroenterostomy could not be performed, anterior operation determined upon. (See Fig. I.)

REMARKS. The history of indigestion for 10 years is suggestive of ulcer. Two months before admission the symptoms began to be aggravated, and it was at this time that a carcinoma should have been suspected. From this time to date the history reveals recurrent exacerbations of all symptoms. Patient has consulted many physicians previous to coming to hospital. No tumor.

Case II. Presbyterian Hospital. No history of gastric trouble. Acute and persistent symptoms, beginning 2 months before admission, becoming worse 2 weeks before entering hospital.

Wilson H. 64. Admitted XI, 25, '13. Discharged XII, 12, '13. (Patient of Dr. Speese.) Chief complaint, generalized pain and discomfort in upper abdomen.

Present illness. Patient states that he has never been ill until 2 months ago when he began to have vague pains and a feeling of discomfort in the abdomen, especially about umbilicus and radiating to the right shoulder. About 2 weeks later the pain became worse, and was of a dull, dragging character. The patient does not think that the taking of food bears any relation to the pain, as the latter is as bad when the stomach is empty as when it contains food. Pressure aggravates the pain. There has been no vomiting and the patient has not felt nauseated. The bowels have been constipated; there has been no blood in the stools. Within the past 6 weeks, patient has lost about 15 pounds. His habits and conduct of life have been exemplary.

Examination. The man is well nourished and well built, and does not appear to be cachectic. The abdomen is tender in the upper half and there is a hard mass about the size of an orange in the region of the pylorus. The liver is enlarged. An attempt was made to pass the stomach tube but the latter met with an obstruction at the level of the cricoid cartilage.

Operation XII, 1, '13, by Dr. Speese. There was a large mass involving the pylorus, extending into the lymphatics and duodenum for about 10 cm. One point of the growth looked as if it were just about ready to break through into the duodenum. On the lesser curvature there was a tumor the size of a lemon. Metastases were found in the liver. Gastroenterostomy.

Shortly after the operation, the patient developed violent hiccoughs which persisted with increasing weakness until his death, which occurred XII, 12, '13. XI, 27, '13. Stools, occult blood positive; Vomitus. Total acidity, 7; free HCl. 0; occult blood, positive. Two X-rays were taken, but both were unsatisfactory.

REMARKS. No previous gastric trouble. Two months ago first vague symptoms. Acute onset. No increase until 2 weeks before admission. Condition inoperable. Tumor present. No emaciation.

Case III. Presbyterian Hospital. History of gastric trouble 4 years ago. Acute exacerbation 10 days before admission.

Joseph J. M. 48. Admitted X, 13, '13. Discharged X, 29, '13. Patient was admitted to the Men's Medical Ward complaining of burning pain in epigastrium and vomiting.

Ten days ago patient ate some clams. About half an hour later he began to vomit, and dates his illness from this time. Three days after this he began to have a dull burning pain in the epigastrium, later becoming very severe, and accompanied by vomiting. He has

vomited continuously and has been unable to keep anything on his stomach. The vomitus was yellowish-green but contained no blood. Bowels have been moving freely. The pain and vomiting have continued until admission to hospital. Four years ago patient had an attack of acute indigestion and was ill for 8 weeks.

On examination patient seems well nourished, although the skin has a yellowish color. The abdomen presents no tumor. There is pain and tenderness over the epigastrium, especially over an area 3 cm. in diameter, 7 cm. above the umbilicus and just to the left of the median line. There is also some pain and tenderness in the back. (Boas point of tenderness.) Stool, no occult blood (meat-free diet). Test meal (Ewald) 32 c.c. Total acidity, 68; free HCl. 40; no blood. Vomitus (X, 14, '13), 160 c.c. Total acidity 39; free HCl. 5; occult blood, positive. Blood, Hb. 64 per cent.; R. B. C., 5,660,000. Leuk. 13,800. X-ray—Ulcer or malignancy.

Patient was transferred to surgical ward X, 29, '13. Operation X, 30, '13, by Dr. Rodman. An ulcer was found near the cardia. This ulcer had evidently undergone perforation at some previous time (4 years ago?), as the omentum was tight and adherent at the site. On the lesser curvature near the cardia, there was a hard, nodular mass about the size of an English walnut. The lymph nodes along the lesser curvature were enlarged, also along the greater curvature. One of the lymph nodes on section proved to be a simple lymphadenitis. The condition at operation was malignant degeneration of a gastric ulcer. (See Fig. II.)

REMARKS. The history of a gastric trouble 4 years ago which persisted for 8 weeks suggests ulcer. All symptoms quiescent since that time until 10 days ago. Even though operation was performed within 4 weeks after the initial symptom, the condition was found to be inoperable. No tumor. No emaciation.

Case IV. Previous history of gastritis. Acute exacerbation one week before admission.

Martha B. Medical ward, Presbyterian Hospital. 48. Admitted IV, 15, '12. Discharged V, 7, '12. Chief complaint, pain immediately after eating, and at no other time, relieved by vomiting.

Present illness. Since March 1st has been much troubled with vomiting at night. Has had pain in epigastrium for a year, but when vomiting began, pain moved over toward the right hypochondrium, although the pain was never definitely localized. There has never been any blood in the vomitus, but patient has had bright blood in the stools after straining. Bowels are constipated. Appetite has been normal.

Previous medical history. Typhoid fever 13 years ago. No his-

tory of gastrointestinal trouble. Was in the Presbyterian Hospital for 5 weeks in 1906 with pyelitis. Family history. Father died of general debility at 81. Mother of same cause at 75. Four sisters living and well. One sister died of enteric fever. No history of renal, cardiac, malignant, or tuberculous disease obtainable. Social history. Tea, coffee and alcohol in moderation. Menses have been regular until December, 1911. Has not menstruated since then.

The abdominal examination at the time revealed a marked distasis of the recti muscles. The whole abdomen is rather tympanitic. No masses or tenderness. The urine was negative. Gastric analysis, Ewald meal, 75 c.c., much mucus; total acidity, 50; free HCl. 19; blood, negative. On microscopic examination, there were many starch cells and fat droplets. No Oppler-Boas bacilli. No red blood cells. Few epithelial cells. Stools, occult blood negative. Blood, Hb. 80 per cent.; Leuk. 7,100.

The patient was discharged *cured*, on V, 7, '12, having gained 1½ pounds during her stay in the hospital (86 pounds). From May until August 16, 1912 (three months), the patient has felt comparatively well. On the 24th of August she was admitted to the surgical ward complaining of pain in the epigastrium and vomiting, practically the same symptoms as were complained of in the medical ward in the Spring.

Notes in surgical ward. Her present trouble began a week ago with vomiting and pain in the epigastric region. This pain was constant, sharp and shooting in character and was generally relieved by vomiting, but not by pressure or position. The vomitus was greenish and very bitter at first but in the last 3 days it has become very dark and with a very sour odor. The patient has been unable to take food for the past week as everything solid causes great pain. During the same period of time she has been belching gas which relieves the pain. Bowels have been very constipated.

On examination, the patient exhibits an extreme degree of emaciation and weakness. She thinks she has lost a great deal of weight. There is a succussion splash heard as far down as midway between the umbilicus and the symphysis. The greater curvature is found to be 8 cm. below the umbilicus, and peristaltic movements can be plainly seen. The stomach was washed out shortly after admission and about 3 liters of a dark, sour smelling liquid removed. This contained free hydrochloric acid 13, total acidity 39. No lactic acid bacilli. Blood, Hb. 65 per cent.; R.B.C., 5,390,000(?); Leuk. 4,600. Stools, no occult blood. Gastric contents, total acidity, 33; free HCl. 0; occult blood, negative; lactic acid, negative; no Oppler-Boas bacilli.

VIII, 27, '13. Operation performed by Dr. Speese. Posterior gastroenterostomy. Stomach was found to be very much dilated

and at the pylorus there was a mass about the size of an egg, very hard to touch. No enlarged glands could be found.

IX, 9, '13. For 3 weeks following operation patient was very weak and gained no weight. During the past 2 weeks she has gained ten pounds and seems stronger. X, 10, '13. The patient seemed in good enough condition to warrant a partial gastrectomy (Dr. Jopson). The growth about the pylorus had enlarged, and there were numerous glands along the lesser curvature, about the celiac axis and beside the aorta. Under the circumstances no further procedure was attempted, and the wound was closed. Patient was subsequently discharged unimproved.

REMARKS. This case is peculiarly interesting, inasmuch as 5 months before operation, patient had complained of stomach trouble for the first time. Four months ago she entered the medical ward, where a diagnosis of chronic gastritis was made and the patient was discharged in a few days cured. Three months later an inoperable carcinoma was found. It is not unlikely that in April the symptoms were of such a mild degree that gastritis seemed to be the correct diagnosis. It is probable that at this time there was a cancerous process, and it may be inferred that had an exploratory laparotomy been done then a radical operation could have been performed. It is in these early stages that the patient should be given a fair chance by means of exploratory incision. Tumor present. Emaciation present.

Case V. Indigestion for 10 years. Acute exacerbation 10 months ago. History of injury at this time.

John S. 50. Admitted to Presbyterian Hospital XI, 18, '13. Discharged XII, 9, '13. Chief complaint, pain at tip of ensiform cartilage.

Patient has complained of attacks of indigestion for the last 10 years, occurring about once a month. These attacks consisted of a feeling of oppression and heaviness in the stomach after meals followed by nausea and vomiting with immediate relief. Did not have any pain or vomiting of blood and did not lose any weight during this time (ulcus?). About 10 months ago he was hit at tip of ensiform with a pump handle and since then has had pain over this area, continuous, but varying from a feeling of soreness to agonizing pain. For a time, following the injury, the patient used to vomit very frequently, once a day, but lately, the vomiting has ceased to some extent. Never any blood. Since the injury he has gradually grown weaker and has lost weight (48 lbs.). The appetite is good but he is afraid to eat. Bowels are regular.

Examination. Anemia and emaciation moderate. Teeth in poor condition. Abdomen scaphoid. There is a mass extending from the ensiform cartilage to 2 cm. above the umbilicus. The mass is very tender, is hard and nodulated. The liver dulness extends 9 cm. below costal cartilage and the organ is very hard. Patient refused operation. Test meal, 110 c.c.; total acidity, 6; free HCl. 0; occult blood present. Stool, occult blood absent; X-ray. Cancer of stomach. (See Fig. III.)

REMARKS. Patient has had indigestion for past 10 years (ulcus?). Ten months ago injury. Acute pain persisting ever since. Condition should have been suspected at that time. Probably inoperable at time of admission. Main interest is relation to injury to gastric trouble. Tumor present. Emaciation present.

Case VI. No history of indigestion. First symptoms 2 days before admission.

Hugh R. 52. Philadelphia Hospital. Admitted XI, 27, '13. Discharged XII, 19, '13. Patient admitted complaining of pain in left inguinal region.

Patient was well until XI, 25, '13, when he was seized with a sharp pain in the left inguinal region. This pain was more a soreness and was remittent. The bowels have not moved for 4 days. There is no history of nausea or vomiting. Patient thinks he has lost 10 to 12 pounds in the past week. The previous medical history is negative except that patient was treated in this hospital 4 years ago for enteritis which lasted 3 months.

Examination. There is a large mass in right and left iliac regions, extending upward to merge with a mass which occupies the epigastric region. Somewhat tender in the right hypochondrium. A tentative diagnosis was made of cystic disease of kidneys, diverticulitis or carcinomatosis abdominis. Temperature on admission, 100.4 deg. F.

Stools, no occult blood. An attempt was made to pass a stomach tube, but was unsuccessful. No X-ray was taken. Operation was performed XII, 3, '13, by Dr. Carnett. There was diverticulitis and a large abscess in left hypochondrium. There was also carcinoma of the liver and general carcinomatosis involving stomach, intestines and omentum.

REMARKS. Between the time of having enteritis 4 years ago, and XI, 25, '13, the patient had had no symptoms, although on admission the tumor masses were apparent even to inspection. When question patient said he had not noticed the tumor until after he strained himself 2 days before admission.

Case VII. Gastric symptoms for two months. Large tumor. No emaciation.

Jeremiah W. 67. Philadelphia Hospital. Admission, I, 29, '14. Discharged. Admitted complaining of swelling of the abdomen, vomiting and eructations of gas. Was perfectly well until 3 months ago, when he noticed a swelling in right groin which involved scrotum. No pain. Two months ago he began to vomit everything he ate. Came on immediately after eating. There was no increase of vomiting up to time of admission, but patient said he came to hospital because he was tired of being sick and wanted to be cured. About 2 months ago, abdomen began to swell, that is, a tumor appeared, which has since grown progressively larger. Never any blood in the vomit. Patient says he has lost about 50 pounds in the last 3 months.

Examination. Patient is a well developed and well nourished male. There is a large tumor in the abdomen which conforms to the shape of the liver and extends downward 4 cm. above the level of the umbilicus. At this point there is a groove which separates the large mass from the smaller one. This shape seems to conform to size and shape of stomach and loses itself below the costal margin. It is difficult to interpret the abdominal mass, but the larger tumor is probably the liver, and the lower, smaller tumor probably the stomach. There is no doubt general carcinomatosis abdominis. No X-ray was taken. (See Fig. IV.)

REMARKS. The swelling in right groin was not apparent at time of admission. Patient said there was still a swelling in the scrotum from the original swelling (varicocele). Until 2 months ago patient was certain that he had had no abdominal tumor. Large tumor present. Emaciation absent.

Case VIII. Gastric symptoms for 3 months. No tumor. No retention. Hyperchlorhydria. The case was reported in detail with Musser some years ago. (Univ. Penn. Med. Bull. May, 1909.) Only the essential features are given here.

O. Y., male. 38. Admitted to the Presbyterian Hospital, I, 29, '09. For the past 3 years patient has been suffering more or less from indigestion. Apart from these slight attacks, patient felt perfectly well until IX, 31, '08, when, during the celebration of Halloween, he partook heavily of cake, nuts, etc., and drank a great deal of cider. This caused him some gastric disturbance, but he did not feel very ill until 2 nights later, when he vomited twice after eating the same kind of food. Several times thereafter he vomited, usually between 12 and 2 A.M. Vomitus was sometimes greenish and contained a good deal of mucus, but never any blood. During the day he felt "sort of draggy" and suffered at

intervals with gastric distension, gaseous eructations, flatus and heartburn, occurring always after meals, but at no definite time, sometimes immediately and sometimes a couple of hours after eating. He suffered with pain at this time in the right and left hypochondriac regions, and at the level of the umbilicus, extending to the ensiform cartilage.

Patient had to stop work XII, 25, '08. At this time gastric lavage was performed for three consecutive days. At the first washing there was much mucus and a portion of orange pulp, which had been eaten the previous day. After the third lavage the practice was discontinued as the patient complained of pain in the region of the gall-bladder and below the ribs. This pain sometimes shifted from the right side to the left, and sometimes he would suffer with pain on both sides just below the ribs, near the median line. During the day he had occasional attacks of pain, but the distress occurred most frequently at night, about 9 P. M. He became weaker and weaker, having dropped in weight from 145 pounds at the beginning of his illness (IX, 31, '09) to 113½ pounds on day of admission (I, 29, '09).

Examination revealed a flat, tense, rigid abdomen but no masses. Gastric contents, 38 c.c.; total acidity, 56; free HCl. 32. Stools, occult blood present.

At operation (Dr. Jopson), a large pyloric carcinoma, the size of an orange, which did not obstruct the outlet, but with metastases to the liver, was found.

REMARKS. This case represents an instance of exacerbation of pre-existing symptoms, with no tendency to abate. The true condition should have been suspected more than 3 months before the patient was sent to the hospital. No reliance on this case could be placed on tumor formation, retention and gastric chemistry, as the first two were not apparent and the third indicated hyperchlorhydria.

Case IX. History of sudden onset. No previous gastric symptoms. Duration 4 months.

William P. 51. Admitted to Presbyterian Hospital, III, 3, '14. Chief complaint, persistent vomiting, pain in the stomach and loss of weight.

Patient has never been sick before. He claims he was perfectly well until 5 months ago when he had pain in his stomach immediately after eating. It was sharp in character and was relieved by belching. These symptoms gradually became worse, until 6 weeks ago, when patient began to vomit immediately after meals. The vomiting seemed to relieve the pain. Since 6 weeks ago the vomit-

ing has gradually grown worse, and for the past 3 weeks he has vomited practically everything. He has never vomited blood. A few days before admission, he vomited food that he had eaten 4 days before. Bowels constipated. Highest weight 142 pounds 4 months ago, now 116.

Examination. Thin, emaciated man. The abdomen is distended below the umbilicus. Slight rigidity over epigastrium. In the left hypochondrium there is an irregular mass the size of a lemon. Gastric contents, 94 c.c.; total acidity, 40; free HCl. 0; lactic acid, positive; occult blood, positive; Oppler-Boas bacilli, positive; white blood cells present. Blood, Hb. 45 per cent.; R. B. C., 4,110,000. Leuk. 10,950. Stools, occult blood present. X-ray, carcinoma of stomach. (See Fig. V.)

REMARKS. The patient was well until 4 months ago. No history of any previous gastric distress. Sudden onset with persistent increase of all symptoms. Tumor mass not being very large is evidently of short standing. If the physician "outside" had suspected carcinoma, early operation might have been of advantage.

Case X. Duration 2 weeks. No previous gastric symptoms. August S. 49. Admitted to Philadelphia Hospital, II, 3, '14. Died, III, 9, '14 (service Dr. F. P. Henry). Chief complaint; vomiting after eating.

Patient denies ever having been sick except with typhoid fever in 1899. Was perfectly well until 2 weeks before admission, i.e., I, 20, '14. He was suddenly seized with a vomiting attack following a meal of scrapple, and since then he has vomited everything. The longest period of time that he has been able to retain anything was 20 minutes. The vomitus was very sour and light in color, never any blood, never any gastric pain. The appetite is good but he is afraid to eat on account of vomiting.

Abdominal examination. Slight rigidity to left of midline. No distinct tumor. X-ray, II, 6, '14, organic hour-glass contraction at the junction of the cardiac and middle portions. (See Fig. VI.)

Operation, II, 26, '14 (Dr. Warmuth). Large carcinoma found at pyloric end of stomach. Anterior gastroenterostomy.

REMARKS. The patient was emphatic about his previous health, there being no gastric symptoms antedating the present stomach trouble. This case emphasizes both the insidiousness of gastric cancer and the need of interpreting sudden gastric trouble as due to carcinoma.

Case XI. Long duration. Extreme emaciation. No tumor. William D. 57. Admitted to Philadelphia Hospital, IV, 13, '12. Chief complaints, loss of appetite, loss of weight and gastric pain. Patient began to have gastric pains and loss of appetite with belching about a month before admission.

The patient was emaciated, the abdomen scaphoid, with a slight amount of rigidity in upper portion. No palpable mass. Gastric contents, total acidity 0.04 per cent.; no free HCl.; no Oppler-Boas bacilli.

Operation, II, 19, '12 (Dr. Müller). Gastrostomy. No carcinoma. No ulcer. Stomach thickened. Good recovery.

Patient readmitted to medical ward I, 21, '14, complaining of weakness, loss of appetite and gradual loss of flesh. Has not been well since operation. Has lost 20 pounds. Emaciation is extreme. No abdominal masses. II, 6, '14. X-ray, some retention after 6 hours. We believe there is a carcinoma of the median portion of the stomach, possibly on the posterior wall. (See Fig. VII.)

REMARKS. This case is included for two reasons, first, that at operation in April, 1912, no evidence of ulcer was found, and secondly, the extreme emaciation without any visible tumor formation, illustrates the uselessness of waiting for the appearance of tumor as a sign of carcinoma.

Case XII. Loss of appetite for past 7 weeks. Illness began 3 weeks ago.

James D. 63. Admitted to Presbyterian Hospital, III, 14, '14. Discharged, III, 20, '14. Chief complaints, loss of appetite, belching, constipation.

Patient states that he was never sick until 3 weeks before admission, but on closer questioning one learns that he has not felt well for about 7 weeks. This feeling of ill health was not very marked but consisted of loss of appetite. Three weeks ago the bowels became very constipated, and together with the belching and loss of appetite, the patient has a heavy draggy feeling in the epigastrium, appearing about an hour after eating. Patient has never vomited and he has never had any abdominal pain. He has lost weight rapidly during the past seven weeks. Highest weight 165, now 128½ pounds.

Patient is somewhat emaciated. There is a tumor mass in the right hypochondrium extending down to level of umbilicus and apparently connected with the liver. Liver enlarged. Gastric contents, 128 c.c.; total acidity, 39; free HCl. 0; occult blood; few leukocytes and red blood cells. Stools, occult blood. Blood, Hb, 50 per cent.; R. B. C., 3,670,000; Leuk. 7,000. X-ray, carcinoma of stomach.

REMARKS. The condition was believed to be inoperable and as there were no signs of retention no palliative procedure was advised.

SYNOPSIS OF CASES

Previous History of Indigestion	Onset
Case 1. For ten years.	2 months ago.
" 2. Never sick before.	2 months ago.
" 3. Four years ago.	Ten days ago.
" 4. Five months ago.	One week.
" 5. For ten years.	Ten months.
" 6. No.	Two days.
" 7. No.	Two months.
" 8. For three years.	Three months.
" 9. No.	Four months.
" 10. No.	Two weeks.
" 11. About a year.	Gradual.
" 12. No.	Three weeks.

A study of these cases reveals the fact that in each there has been either a sudden increase in severity of pre-existing symptoms or else the gastric symptoms have suddenly made their appearance, unheralded by any previous history of indigestion. This point is an important one, and one should suspect carcinoma in any individual of middle life, who furnishes a history of previously good digestion with a sudden and persistent attack of gastric distress, or who complains of a sudden increase of gastric symptoms with no amelioration of the same under appropriate medication and dietetics.

The general conception of gastric cancer is, that it is a disease of long standing with pain as a characteristic symptom, and it will therefore seem astonishing that the disease may be widespread with practically no symptoms. I am inclined to believe that suddenness of onset is an important point in the diagnosis, but this sudden attack of gastric distress unfortunately may be delayed until the condition is inoperable. Osler and McCrae, in their monograph on "Cancer of the Stomach," page 29, write, "Usually spoken of as gradual, a surprisingly large number in our series gave a history of acute onset. There were 37 cases (in a series of 150) in which the onset might be termed sudden. Of these, in 26 the onset had been

within a period of 3 months previously, in 8 the onset was 3 to 6 months before, and in 3 it was over 6 months."

The writer urges watchfulness for and proper interpretation of symptoms such as described, and he suggests earlier co-operation between the surgeon and internist, with a view to more frequent exploratory operation in cases similar to those detailed above. Exploratory incision should be early considered, and should not be delayed until late signs (changes in gastric chemistry, retention, tumor and emaciation) are observed. Only by early recognition and timely operation can one hope to lower the present high mortality of gastric carcinoma.

ABDOMINAL RIGIDITY

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The importance of this sign in the examination for abdominal disease is hardly appreciated by the average physician. We shall speak of certain varieties of rigidity and of methods for their detection.

Abdominal rigidity may be generalized, and found upon any attempt to examine the abdomen, in ticklish individuals in perfect health. Because of their over-sensitiveness to slight irritation they are unable to relax the abdominal walls for the examination. Fortunately the absence of other signs and symptoms of illness in these subjects suffices.

Pathological rigidity signifies that the muscles of the abdominal wall are thrown into contraction by some irritation within the abdomen, the irritated peritoneum being the usual medium of communication. In case of acute general peritonitis the whole wall becomes of board-like hardness in most instances, and extreme tenderness is present, usually accentuated over the seat of the perforative lesion which has commonly given rise to the peritonitis. Shock and collapse are present or shortly appear, and the tense wiry pulse is significant.

It is of localized rigidity that we should especially speak, since this is the type so often not discovered or not appreciated at its full value. It signifies that some inflammatory and usually painful process is under way in some subjacent organ, and is likely to be the one sign of greatest importance in the decision as to whether the trouble is a purely functional one or one based upon organic changes within or near the abdomen.

For its detection one should feel lightly with the finger tips over the soft parts of the abdominal wall, by no means neglecting the lateral or even posterior aspects. Comparison with the opposite side is absolutely essential to its detection, since unilateral rigidity is of much more significance in differential diagnosis than the bilateral form.

It is interesting to observe in certain cases, notably those of chronic appendicitis with comparatively slight changes in the structure of the organ, that the phenomenon we study may appear only after a somewhat prolonged and thorough examination, the appendix in a comparatively quiescent state giving rise to but slight rigidity in the overlying muscles.

Roughly in the order of frequency in which the sign is found in the abdomen, we may discuss its presence in the following conditions:

A. Appendicitis. In the acute form it is an early and almost constant feature. In the overwhelming septic type in which fever fails, it is possible for rigidity to be insignificant. In degree it varies in accordance with the type of appendiceal inflammation and with the position of the affected organ. In the anteriorly placed appendix, with involvement of the peritoneum of the anterior abdominal wall, in which cases the appendix is easily accessible to palpation, rigidity is generally well marked. If the organ be retro-cecal, so that the pressure of the examining fingers is air-cushioned by the distended cecum, much skill may be required to detect the sign. In the pelvic type of appendicitis rigidity may be practically absent, since the inflammatory focus is not accessible to palpation from the abdomen. In the variety in which the appendix is placed outside of the cecum the rigidity may be found only to the outside of a line extending upward from the anterior superior spine. This is a common enough location to deserve especial consideration, as I have frequently seen

it entirely overlooked. In a case of retrocecal abscess the rigidity of the right lumbar muscles is often striking.

Since a fraction of one per cent. of cases of appendicitis gives rise to left-sided symptoms we must not dismiss the thought of appendicitis merely because rigidity utterly fails upon the right side. In those cases in which a non-rotated cecum has left the appendix in the lower left abdomen, and in those in which a long appendix with an engorged and tender tip reaches just past the central line, rigidity of the left rectus or even the entire left side is at times to be detected.

Although pertaining to acute inflammatory conditions of the appendix rather than to atrophic processes as a rule, yet rigidity may be very well marked in the latter conditions. It is in the milder and more chronic forms of the disease that the rigidity is brought out by persistent palpation, though absent or nearly so at the beginning of the examination.

B. Typhoid fever. Rigidity is often present in the right lower quadrant when the inflammatory process is severe, and more especially when marked adenitis is present or perforation threatens.

C. Peptic ulcer. In my own experience I should place this condition next as a cause of rigidity, although 40 per cent. of my operated cases (previously reported) showed none. In general, the sign is present on the right side excepting in the case of gastric ulcer to the left of the center line of the body, when the left rectus is especially involved. I am not aware that any distinction is possible between gastric and duodenal ulcers so far as this sign is concerned. The most striking rigidity is to be found over ulcer of the anterior wall of the stomach. This may be exquisitely shown in case the ulcer is attempting to perforate.

D. Gall-bladder disease. Rigidity of the right upper quadrant is practically always to be detected in case of gall-stones accompanied with any inflammatory condition in the gall-bladder, as well as in distended gall-bladder, and malignant disease of that organ. Simple biliary lithiasis may give rise to repeated attacks of biliary colic, but never show the least rigidity excepting at the immediate time of the colic.

E. Pelvic disease. Probably inflammatory diseases of the female generative organs should come next in order, and the rigidity may

be unilateral or bilateral. The sign is of relatively less importance in this field than in the others we are considering. In diseases of the urinary bladder, rigidity is often present, but overshadowed in importance by other signs and symptoms.

F. Cancer of the stomach. Rigidity is usually present as soon as the disease is sufficiently advanced to cause either material thickening of the wall or adenitis. It is naturally more common on the right because of the frequent involvement of the pylorus. In malignant disease of the cardiac portion of the stomach it may be absent.

G. Kidney. In inflammatory and malignant diseases of the kidney, but most frequently in the floating kidney which has become engorged and tender, the sign is well marked. While commonly found anteriorly upon the affected side it may be noted in the loin.

H. Liver and spleen. In cirrhosis of the liver, malignant disease and other conditions causing chronic enlargement, excepting in fatty, amyloid and echinococcic liver, rigidity may be present. In case of the engorged liver of an alcoholic debauch, in abscess, in leukemia accompanied by perihepatitis, and in cancer with peritonitis over a projecting nodule, the rigidity may be extreme. The spleen rarely gives rise to rigidity unless perisplenitis or a greatly and acutely distended capsule is present.

I. Miscellaneous. In a group of conditions comprising lead poisoning, diseases of the abdominal wall, the mesentery, omentum and pancreas, thrombosis and embolism of the mesenteric vessels, cancer of the bowel, abdominal peritonitis, rigidity may be noted, but is of less decisive importance as to differential diagnosis than in the diseases first considered.

J. Reflex. Most deceptive of all types is that found as a reflex from diseases involving the diaphragm or the organs above it. We may charge many cases of useless operation for supposed appendicitis to the discovery of rigidity in the right abdomen in cases of pneumonia, notably of the right lower lobe, since pain alone would not suffice to lead to a diagnosis of acute abdominal disease in such cases. The need of verifying the possibility that rigidity in the abdomen may be of such origin must never be forgotten. I have even noted marked abdominal rigidity on the left side in a case of mediastinitis from injury from a fish bone in the esophagus, the left

pleura being the means of conduction of the inflammation to the diaphragmatic region.

In general we may look upon localized rigidity in the abdomen as of much the same decisive importance in this field as are moist râles in the apex of the lung in the diagnosis of pulmonary tuberculosis. In each instance the sign in question is the one least likely to deceive us and least likely to be modified by the wishes, fears or actions of the patient. The statement that the subject coughs or suffers severe pain is to be given due weight—but râles in the one case and rigidity in the other mean vastly more to the diagnostician.

THE DIAGNOSIS OF MALIGNANCY

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The diagnosis of malignancy as taught in surgical treatises is only that of advanced malignancy, often too far advanced for satisfactory operation. Microscopic diagnosis is the only one compatible with the best operative results, and this should be depended upon almost exclusively.

In some 2000 cases of disease of the breast treated in the clinics of the Massachusetts General and Johns Hopkins hospitals, over seventy per cent. were cancer, and about twenty per cent. more were conditions capable of becoming malignant. All malignant and potentially malignant cases occurred after the thirtieth year. Similar conditions obtain in other regions. Hence, all tumors in persons over thirty years of age should be removed as soon as discovered, and a microscopic diagnosis made at the time of operation. In view of the earlier occurrence of sarcoma this rule should be extended to cover all growing, doubtful tumors in younger subjects.

The general adoption of these principles by surgeons, and the education of the profession and the laity to their acceptance would do a great deal to improve the results of surgery against malignancy. I have taught this to my students in the University of Minnesota for many years, and the results have been very satisfactory.

Opportunity to remove very early different types of malignant

tumors has impressed me with new views in regard to the malignancy of certain of the sarcomata, especially these microscopic varieties which usually recur locally. In 1910, in the temporary hospital of the University of Minnesota I removed five small sarcomata, only one of which was diagnosable clinically. None of these have recurred up to the present time, four years, and all, I think, can be considered cured. These were small, movable tumors in the subcutaneous tissues, two in the arm, one in the forearm, one just below the umbilicus, and one in the middle of a large port-wine angioma below the breast in a woman of thirty. This with one of the growths in the arm and the one from the abdominal wall were angiosarcoma, quite cellular, and gave a bad prognosis as to both local recurrence and life. The others were fibrosarcoma and seemed much less malignant. In only the tumor arising in the port-wine mark was any amount of surrounding tissues removed; still, all cases have remained well, and the conclusion must be that they were removed before local infiltration had begun. The case in the abdominal wall was in a medical student and had been under observation for about a year, during which there had been little growth.

It would seem that the period during which these sarcomata remain purely local was longer than we would expect, and that our views as to this pre-malignant period may be changed by very early operations in all cases.

If the laity can be educated to believe that all tumors should be removed as soon as discovered, and that the necessary operation is a very insignificant one usually under local anesthesia, then much better results will be attained. The overburdened general practitioner instead of studying his tumor patients in an attempt to discover or exclude malignancy, will simply remove, or have removed, the tumor in question and send same to a competent pathologist for an exact diagnosis. The dangers of irritation of small tumors seem well understood by the laity. How much easier to avoid this danger by removal of the suspected tumor. Electric needles, caustics, etc., must be avoided and the knife substituted. I have recently treated a most malignant lymphangiosarcoma arising from the needling of a mole on the face, in a woman of thirty-five. Cure which seemed impossible by operation, was attained by the use of the Coley toxins, and the patient is now well (six years).

In epithelioma, growth and dissemination is so slow that a clinical diagnosis can nearly always be made in time for successful operation. Here the point of most importance after the wide removal of the new growth is the removal of the regional lymphatics. No matter how small the primary growth, or how early it is seen, any other course in epithelioma of the lip is inexcusable, and in other regions the radical operation is always desirable and usually possible.

In uterine cancer the severity of the radical operation may rightly prevent its general adoption, but this is the only important exception to the rule requiring removal of the regional lymphatics in every case.

My conclusions are: Properly treated malignancy gives no diagnostic clinical symptoms. All tumors should be removed when discovered. Diagnosis should depend upon the microscopic examination of removed tumor. Early and ever earlier operation is the keynote to success against malignancy.

ANTE-MORTEM AND POST-MORTEM DIAGNOSIS

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Dr. Richard C. Cabot's candid comparison of ante-mortem diagnoses with results obtained from necropsies has attracted so wide attention and has led to so marked diagnostic nihilism, that it may be worth while to present the other side of the matter. So far as our observations are concerned, we have been impressed with the general corroboration of clinical by pathologic findings. That this statement may not be considered boastful, we hasten to add that we include more than personal decisions and experience and that we have made allowances that Dr. Cabot undoubtedly did not make, in his desire to be sternly critical.

There are certain exposed or readily accessible portions of the body which, except for certain limitations to the removal of tissues for microscopic examinations, offer the same advantages for diagnosis as those attainable at a necropsy. There is one tissue, the blood, which offers the same advantages in life as after death, per-

haps greater, and with only the most trivial obstacle to obtaining samples, unless these are intended for special investigations when larger quantities are required. Such investigations are rather in the way of research than of diagnosis. With these exceptions, a necropsy obviously allows inspection in the most minute way, of all tissues and organs, and affords the most direct evidence of various lesions which, during life, can be merely inferred—though often with a high degree of probability, sometimes amounting to practical certainty—by the clinician and of other lesions entirely inaccessible to the clinician. On the other hand, functional conditions and functional manifestations of certain organic lesions can usually be more readily diagnosed during life than at necropsy.

It is thus apparent that the word *diagnosis* has a different significance in clinical, as compared with necropsy findings. We recall no necropsy which did not reveal anomalies or latent disease or details of a known, existing disease, which had not been diagnosed prior to death. But, in the great majority of instances, these post-mortem findings applied to conditions which did not affect the practical management of the case or to conditions which, humanly speaking, were absolutely undiagnosticable during life, short of exploratory methods which were either refused, or unjustifiable. From the standpoint of attainable diagnosis during life, discrepancies with the pathologic diagnosis have usually been explained by gross incompetence, lack of development of scientific skill at a given date, inadequate time allowed for observation during life, and physical state of the patient either inhibiting known and diagnosticable signs or preventing thorough examination on humanitarian grounds. Perhaps a further ground for discrepancy should be mentioned: there are certain lesions, well described but so extremely rare that their diagnosis is scarcely justifiable except by direct pathologic examination.

We have attended three necropsies which, even with the clinical history, failed to determine the cause of death. One of these cases had been shown clinically to be achylia gastrica et pancreatica—an adequate cause of death by inanition but the adequate reason of its development could not be determined either clinically or post-mortem. One of the others was probably of the same nature but had not been investigated along these lines, the writer not having seen the case before death. In the third, acute insanity and death, slight

meningitis was found, but the examiners disagreed as to whether the lesion was sufficient to cause death.

A discrepancy between clinical and necropsy findings cannot always be decided off hand in favor of the latter. We recall a case of iliac aneurysm, plainly palpable during life. At necropsy, the artery was found undilated and the attendants made merry at the expense of the writer until he reminded them that they and others had all felt the aneurysm and its bruit and had concurred in the diagnosis. A fountain syringe hanging on the wall gave an inspiration. On distending the artery with water, it bulged at the place and to the degree palpated during life, indicating the existence of a collapsible aneurysm, a condition on which the literature is exceedingly meager. Movable kidneys offer a considerable field for discrepant observations. During rigor mortis, a first degree movability may be negated. On the other hand, the kidney grasped within the abdominal wall, either at necropsy or operation, is considerably more movable than by ordinary external examination.

As illustrations of conditions so rare as not to warrant diagnosis *intra vitam* may be mentioned the two following: Perforation of ovarian cyst into colon, intestine and stomach partly filled with cystic contents which had been vomited during life. Hepatic area by auscultatory percussion, one inch in diameter; clinical expression of ignorance of state of liver (this was really not a clinical experience but one made on a cadaver prior to section); verification of extreme contraction of liver by section.

It should be borne in mind that a clinical diagnosis is usually partly one of pretty dependable evidence, partly one of inference as to details. For example, one may make, with practical certainty, the diagnosis of a septic intra-abdominal infection, locate it by gross anatomy, and determine the prognostic and therapeutic indications with a high degree of accuracy. But, when one goes so far as to say that the appendix, gall-bladder, etc., is involved, he is merely making an inference, usually reliable in a percentage sense, but obviously liable to error in any individual case. For instance, a case first regarded as probably involving the gall-bladder, possibly the appendix, was later amended, by the location of the tenderness and tumor, so as to reverse the probable and possible diagnosis. On section (by operation with recovery) the condition was found to be one of sep-

tic cholecystitis, with great congestion of the liver carrying the gall-bladder down to the level of the appendix. Even in this case, the correct diagnosis could have been made clinically, except for the humanitarian and, indeed, vital contraindication to forcible palpation and percussion. But, generally speaking, occasional errors of locational diagnosis will be made which are inevitable and, from the practical standpoint, unimportant. There may also be cited cases of abdominal (small) tumors with obstruction plainly affecting the small intestine, naturally regarded as tumors of the small intestine or adjacent structures, but really involving the colon or sigmoid but not so as to cause occlusion at their site. It is plain that the necropsy will revise, without necessarily censuring the clinical diagnosis. In general, the exact position and extent of a tumor, the number of minute tumors, etc., cannot be determined except by direct inspection. So, too, certain tumors, as of the cardia and pylorus, may properly be diagnosed as cancerous yet, in a small proportion of cases, as in one recovering after actual demonstration of the tumors by operation, this diagnosis must be supplanted by another.

Cardiac valvular lesions are located almost entirely by the functional test afforded by the circulation of the blood producing audible or at times palpable vibrations. We recall an instance in which a two-way aortic lesion was diagnosed by a mere tyro and negatived by an expert clinician. Necropsy showed the former to be right. But, the latter was deprived of an indication usually present but absent during his attendance on the case, by the weakening of the circulation. In one instance, we felt justified in diagnosing all four regurgitations and one or two direct valvular obstructions. The first item was verified by necropsy, the second could scarcely be determined by the post-mortem findings. Generally speaking, we believe that the diagnosis of valvular heart lesions, of those depending on effusions, of those involving change in size and position, rhythm, and some other details, can be accurately determined during life, provided the conditions are such as to enable the usual acoustic signs to be heard. The nature of a degenerative change, a lesion of the bundle of His in heart-block and certain other conditions, obviously cannot be determined with absolute accuracy.

A good deal of the discrepancy between ante- and post-mortem diagnosis would be eliminated, if we bear in mind that the latter

furnishes information as to anomalies and latent or residual lesions which usually cannot by any possibility be diagnosed by the clinician although, in some cases, anomalies are apparent from their superficial location and, especially if the clinician's acquaintance with a case is extensive, he may often know of residual lesions, as of the appendix, pleuritic and peritoneal adhesions, etc., at least with considerable probability, though seldom with exact localization.

Another part of the discrepancy is due to the complication of lesions, usually present. It is sometimes easy, sometimes difficult to assign to these, their relative importance and the relative importance may vary at different times or according to the viewpoint of the attendant. So, too, the relative importance may be very different from the standpoint of the clinician and of the post-mortem pathologist. Let us take, for example, a case under treatment for a surgical injury, a gynecologic condition, a fever, a brain lesion or even for some alimentary disturbance, as a chronic gastric ulcer, sigmoiditis, chronic inflammation of the appendix, etc. At necropsy, the pathologist accuses the clinician of being at fault for not having diagnosed gall-stones. Now, the fact remains that the great majority of cases of gall-stones are not diagnosticable during life, although they may be suspected. But to suspect a fairly common condition in all cases liable to have it, does not constitute a diagnosis and is not a mark of diagnostic acumen. Without belittling the importance of gall-stones, it should be remembered that the cases which do not cause marked symptoms leading to a diagnosis, do not constitute a disease in the practical sense. It is true that they may predispose to cancer, and that they favor septic developments. But such developments may occur without gall-stones, they are diagnosticable and subject to treatment, medical or surgical, irrespective of the existence of stones. Moreover, gall-stones may be found at necropsies on aged subjects who have enjoyed good general health and who have never presented symptoms that could be ascribed to the stones. It should be realized that gall-stones are discussed here merely as an illustration of the general fact that a very conspicuous post-mortem finding may not constitute a disease in the clinical sense.

Another important item in the discrepancy between clinical and post-mortem diagnosis, is the failure of the clinician to distinguish sharply between demonstrations, more or less approaching absolute

accuracy, and inferences. In most diagnoses, three factors are included: the ultimate etiologic nature (identification of germ, etc.); the pathologic process resulting; the location, in the regional, and visceral senses, and as regards size, multiplicity, etc. Generally speaking, some of these factors can be determined by the clinician with almost absolute accuracy in a given case, while others are merely inferred from the usual location of organs, the usual course of disease as previously observed, etc. For instance, in a given case, we may be practically sure of syphilis, tuberculosis, etc., but may not be able to state what organs are affected. In fact, there are very few instances in which we can be certain that, in addition to known lesions, there may not be others. On the other hand, especially in affections involving parts of the nervous system which normally control definite functions, and in the case of various conditions of the lungs and heart producing definite acoustic signs, we may locate a lesion with great accuracy but can only guess as to its nature. At times, we can locate, regionally, and state the size of a lesion very accurately but we cannot be sure either as to its nature or the exact organ involved.

THE MACROSCOPIC DIAGNOSIS BETWEEN TUBERCULOSIS AND PAPILLOMA OF THE PERITONEUM

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A certain number of cases of tuberculosis of the peritoneum present macroscopic characteristics which are very different from those of the familiar miliary tuberculosis of the peritoneum.

Some years ago I was asked to operate upon Miss J., twenty years of age, of Ithaca, New York, for a rapidly progressing abdominal condition believed to be neoplastic and relating to the uterine adnexa. On opening the peritoneal cavity it was found that various loops of bowel thickened with interstitial infiltrates were so massed together by adhesions that it was impossible to approach the pelvic cavity, without tearing fragile bowel walls. Free peritoneal surface was studded with large elevated masses of neoplastic deposit, but

without accompanying areas of acute inflammatory character. My diagnosis was that of malignant papilloma, and a prognosis to the effect that the patient had a very short time to live. A drain was inserted and the abdomen closed. The case passed out of mind. About a year later I happened to meet one of the consultants and asked how long Miss J. had lived. He replied that she was quite well, had gained twenty or thirty pounds in weight and that her cure had been ascribed to Christian Science. My opinion having been accepted as final from responsible medical sources, the family had yielded to the importunities of friends and allowed the patient to be cared for by Christian Scientists. Up to this time I had been so sure of the diagnosis of malignant papilloma that the specimen which had been placed in a bottle of alcohol had not even been examined. The specimen on being examined showed the characteristic features of tuberculosis. Recovery had apparently occurred in the ordinary way through hyperleukocytosis excited by the opening of the peritoneal cavity.

On May 30th of the present year I was called by Dr. J. E. S., of New York, to see Miss M. W., fifteen years of age, who presented a rapidly growing pelvic cyst extending to the navel. My diagnosis was that of multilocular ovarian cyst. The operation was performed at St. Elizabeth's Hospital. Upon opening the abdominal cavity the peritoneum was separated from adherent bowel with great difficulty and a very long incision was required. The peritoneum in this case resembled that of the peritoneum of Miss J. When the tissues of the cyst wall were opened, several pints of straw-colored fluid escaped from the main cyst and a smaller amount of fluid from two lesser cysts. The cyst wall consisted of adventitious tissue about half an inch in thickness at some points. My diagnosis was that of malignant papilloma, but I made the remark that many years ago I had seen a peritoneum with similar neoplastic studding that turned out to be tuberculous, and there was a possibility of this case being one of tuberculosis, although that was not my opinion. Masses of adventitious tissue of the cyst wall were separated, and a drain inserted. The patient began to gain at once, and when the laboratory specimen had been prepared for report, there was primary union of the incision and the patient improving rapidly in general condition. The specimen examined by Dr. Mac

Neal of the Post-Graduate Hospital Laboratory showed the tissue of tuberculosis. Acid-fast bacilli were found in this tissue. The patient is now out of bed making good convalescence.

These two unusual cases of tuberculosis of the peritoneum bring to mind a case last year in which I happened to look in upon another operator at work. He was separating adventitious tissue from the peritoneum of a young girl. His diagnosis was that of malignant papilloma and his conscientious removal of a larger amount of adventitious tissue than I had removed resulted in her death. From my experience with Miss J. and Miss W. I have the impression that the case belonging to my friend may also have been one of tuberculosis and that the patient might have recovered, had he—an expert surgeon—recognized a rare form of tuberculosis of the peritoneum simulating malignant papilloma.

A VALUABLE DIAGNOSTIC AND PROGNOSTIC SIGN IN CHOREA OF CHILDREN

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Regardless of all that has been written about the various manifestations of chorea, it is undoubtedly true that the differential diagnosis between chorea and conditions simulating it, is not infrequently extremely difficult. Ordinarily chorea is readily recognized by the presence of spontaneous or induced irregular and spasmodic movements of the tongue, face and extremities. But there are many cases which escape recognition on account of the mildness of the symptoms. In these cases, the typical movements may be made to appear by a procedure which I described in the New York Polyclinic Journal of April, 1909. Since that time I have been able to demonstrate this same phenomenon in numerous other cases and have employed it not only as a diagnostic but as a prognostic sign.

This sign may be produced in the following manner: The palm of the patient's left hand is placed upon the palmar surface of the observer's right hand. Then the thumb of the patient is embraced by

the index and middle fingers of the physician and the other four fingers firmly grasped by the remaining fingers of the examiner. The right hand of the patient is similarly grasped by the left hand of the physician. The attention of the patient is then invited by asking him a simple question, for instance, his name, age, address, etc., at the same time having him look directly into the eyes of the examiner. If the patient has chorea, the twitchings of the hands will be distinctly augmented each time his attention is engaged by the mental concentration required to answer a question. The firmer grasp the observer has upon the patient, and the more he is able to disengage the patient's attention from the examination, the more surely will he be able to discern the finer muscular twitchings indicative of the early stage of chorea.

In all nervous diseases accompanied by incoordinate actions of the voluntary muscular system, to which class chorea belongs, checking cerebral inhibition almost always promotes motor excitation; therefore the elimination of the cerebral control in the test above described, tends to augment the movements of the over-irritable muscles. That this phenomenon can best be demonstrated in the muscles of the hand is explained simply by the fact that the testing apparatus, viz., the hands of the observer, is sufficiently sensitive to detect the slightest movement on the part of the subject.

This test is very delicate and is often present when choreic movements of the extremities cannot be seen. Every nervous child should be submitted to the test so that chorea may be excluded. Although several neurologists and pediatricists have mentioned the occurrence of increased muscular irritability in chorea when cerebral control is inhibited, there has been no attempt to employ this phenomenon either as a differential diagnostic or as a prognostic sign. As early as 1890 Sachs said in an article on chorea in the 4th volume of "Keating's Encyclopedia": "If the nature of the disease is in doubt, I ask the little patient to place his hand quietly upon my own, or between my two hands; in this way the irregular choreic movements can be easily seen or felt. The true nature of many a trouble which appears to be nothing more than a 'little nervousness' may thus be detected."

This sign is not only of value in diagnosis but is of considerable prognostic importance. In patients who are steadily improving the

twitchings of the muscles of the hand, as evidenced by the test, become gradually less and less marked, so that eventually not the slightest movements can be detected. When the last trace of irritability disappears in the muscles of the hand, the patient in nearly every instance will have lost all evidence of choreic twitchings in the other muscles of the body and the disease may be considered at least temporarily cured.

Considering, then, that this sign may be demonstrated in the earliest stage of chorea before visible manifestations appear, that it may serve to differentiate chorea from analogous conditions, that at all times it is an index to the severity of the disease and that its disappearance signifies in nearly every case a corresponding cessation of the other manifestations of chorea, it would seem that it is of considerable importance.

MIXED INFECTIONS IN TUBERCULOSIS

By LOUIS CURTIS AGER

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The present status of the question of mixed infections in pulmonary tuberculosis is a striking example of the way in which medical theories may be mistaken for facts for many years, until they become the starting points for further theories and perhaps for further errors. Prudden, working in the laboratory of the New York College of Physicians and Surgeons in 1893-4, apparently showed the direct relation of secondary organisms to cavity formation in pulmonary tuberculosis, and from that time until quite recently it has been the custom to refer all septic symptoms to the pyogenic organisms. Wright in 1907 expressed the opinion "without fear of contradiction" that the pyogenic organisms are present in all tuberculous infections that showed signs of suppurating. Klebs in 1909 assumed the same position and carefully tabulated the various organisms causing the so-called secondary symptoms.

Further grounds for this very general assumption have been found by various investigators who have secured positive blood cul-

tures of the secondary organisms in a varying proportion of cases of tuberculosis. The most notable report of this kind was presented at the 1912 meeting of the National Association for the Prevention of Tuberculosis, by Brown and Petroff. Their proportion of positive cultures and the variety of organisms found exceeded the results of all other investigators. Coming from such a source the report would naturally have great weight and would be the rational justification for the use of vaccines by those clinicians who believe in the efficacy of such treatment in the presence of a bacteriemia. In direct contradiction to this report, Avary and Lyle, in the *Journal of Medical Research* for May, 1913, reported that in one hundred consecutive blood cultures from cases of pulmonary tuberculosis including eight terminal cases not a single positive result was secured. Clinicians who believe in the use of vaccines only in cases of localized infection would find justification for their use in such a report, providing that they accept the teaching that the secondary organisms are responsible for the "septic" symptoms. Assuming that these findings were correct and that the secondary infection is therefore entirely local, would still further justify the use of vaccines in the treatment of the "septic" symptoms. With this idea in mind I treated ten children in various stages of pulmonary tuberculosis with a mixed bacterin. The results, which were absolutely negative, were reported at the last meeting of the Medical Society of the State of New York. Other clinicians, however, have reported excellent results both from stock and autogenous vaccines.

Considering all these contradictions it would seem important to determine the exact relation of the secondary organisms to the symptoms of tuberculosis. Baldwin, Marmorek and Römer have shown conclusively that the tubercle bacillus can produce all the tissue destruction found in tuberculosis and it is reasonable to suppose that all the symptoms accompanying those changes might be accounted for in the same way, particularly if Vaughan's split protein poison theory of infection be accepted. On the other hand, we do know that the various secondary organisms are not only present in the sputum, but also in the lungs at autopsy. Unfortunately so far as I know there are no extensive reports on the virulence of the organisms recovered in this way. Avary and Lyle found the usual organisms in the washed sputum of fifteen cases but in no instance were

the streptococci hemolytic and they state that "the virulence of the organisms was not pronounced." In the *Zeitschr. f. Tuberkulose*, Vol. XXI, Nos. 2 and 3, 1913, was published the Weber-Parkes Prize Essay for 1912, "Mixed and Secondary Infections in Pulmonary Tuberculosis," by J. A. D. Radcliffe. His conclusions are as follows:

(1) In the majority of cases of advanced tuberculosis of the lung the tubercle bacillus is the sole infecting agent, and the other bacteria in the sputum are only accidentally present and can be removed by washing.

2. When a true secondary infection is present it is impossible to remove the causative microbe from the sputum by washing.

3. A consideration of the temperature chart and general condition alone cannot determine the presence or absence of a secondary infection.

In describing the technic another statement is made which is important.

"It is the elimination of necrotic particles that is essential, as such particles have been cast off from the wall of a cavity. These particles always contain an abundance of bacteria which always exist in the contents and necrotic walls of a cavity without exercising pathogenic functions."

This statement appears to me to weaken the whole argument and render futile the Sorgo method of washing sputum. It simply proves, providing technic is accurate, that the secondary organisms are found in necrotic tissue only. This rather strengthens the view of those who hold that the secondary organisms are the cause of the necrotic changes, and I know of no investigations to substantiate the statement that they can occupy the walls of a cavity without exercising pathogenic functions. We know that tubercle bacilli may be found in moderate numbers at the same site, and whatever tubercle bacilli are found in material from a necrotic cavity must have been present at some time or other in necrotic tissue.

These considerations make it necessary to fall back upon the biochemical phenomena of these infections for a solution of the question. These are found in the reaction to vaccine therapy as reported by Radcliffe and others. He reports his results in the use of single and mixed vaccines in those cases in which he thought the organ-

isms might be a causative factor. His experience corresponds with my own,—that only in rare cases is there any systemic reaction good or bad. He went a step farther, however, and proved by the opsonic index that his cases had responded to his vaccines. Nevertheless there was no systemic reaction, which apparently proved that the vaccine organism was not the one producing the disease.

Although the problem is not yet solved the present tendency is to make very light of the rôle of the secondary organisms. With past experiences in mind it will be well to guard against extreme views on either side of the question until it can be answered authoritatively by some new discovery in biochemical reactions.

A HITHERTO UNDESCRIBED SIGN OF SOME VALUE IN THE DIAGNOSIS OF CHRONIC UREMIA

By THOMAS F. REILLY

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I believe that most of us have so long associated the complaint of bad taste in the mouth with digestive disorders that we are apt to overlook the fact that it is quite often the expression of other diseased conditions.

My attention was first drawn to this matter about one year ago, when a series of patients over forty years of age complained of a bad taste in their mouth which they associated with digestive disorders. Most of them complained of flatulency in the upper region of the abdomen, which had no fixed time relation to meals. On close examination, I found that in all of these patients, there was an associated high tension pulse, averaging from 180-280 m.m. Hg. Closer study showed in nearly every instance other evidence of chronic nephritis, of which the digestive complaints were only advance symptoms. Further investigation revealed that in very many cases of high arterial tension without any digestive symptoms, this sense of bad taste would occur, often antedating other symptoms by months. The patient rarely complains of it because he thinks that it only represents an upset stomach, and as such is like any of the

penalties that one pays for civilization. One cannot regard the complaint of bad taste in the mouth which occurs only occasionally as being of any significance. It is only when it is more or less constantly present that its importance becomes manifest.

In forty cases of high arterial tension associated with other signs of nephritis, seen within the last year, thirty had experienced the symptom for a greater or lesser period of time. As a rule, the complaint in the beginning was restricted to the time shortly after awakening in the morning, and disappeared first on washing the mouth, and later only after breakfast. Then it might disappear entirely for a few weeks to reappear later on. In this way it closely resembles the severe uremic headache so characteristic of the early morning hours. In other cases, the bad taste was complained of after exertion or at the close of the day when the patient was fatigued.

One reason why the bad taste is so commonly overlooked in these cases is because we have no means of measuring or standardizing taste. That there is no accounting for tastes is an old and true saying, and even in intelligent patients, but more often in hospital cases, it is frequently difficult to find out just what a taste resembles. In general, the cases that show high arterial tension and signs of nephritis complain of either a bitter or sour taste, and the taste seems to be general over the whole mouth.

As one would naturally expect, the bad taste diminishes and disappears just in proportion as the general underlying condition improves. In general it may be stated that the more constantly it is present, the worse the prognosis.

It is quite natural to suppose that the *raison d'être* of this condition is an effort on the part of nature to get rid of poisons through the mucous membrane of the mouth.

These various toxins are perceived by the patients. The sign is present in many cases before headache, insomnia, and eye symptoms manifest themselves, and I am led to conclude that when any patient over forty years of age complains of persistent bad taste in the mouth, with or without any other complaint, it is incumbent on us to take a blood pressure reading and have a careful urinary examination made.

A CASE OF COMPLETE HEART-BLOCK, WITH POST-MORTEM FINDINGS

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AND

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Cases of heart-block occur very commonly nowadays in the literature of circulatory conditions, and the only excuse for the present communication is the fact that we were able to study our patient with great care, both during life and after death.

The following is a short resumé of the case:

G. M., male, aet. 54; mechanic.

Admitted to the Toronto General Hospital on November 30, 1913.

Complaint. Attacks of unconsciousness. Duration about two years.

History. Was born in Scotland. Worked for 30 years as a contracting engineer. Lately has been furnace man and mechanic to a public institution. Used to drink heavily, but not recently. Has always been a moderate smoker.

He is married and has two daughters alive. One son was still-born, and the next two died of hydrocephalus, one at six months and the other at twelve months of age.

Previous health. Was always very healthy until two years ago. Had gonorrhea several times and some years ago had a soft chancre accompanied by a bubo. No history of syphilis and the Wassermann reaction is not present in the blood.

Present illness. One cold afternoon two years ago, patient's vision suddenly became blurred and he fell to the ground and soon became unconscious. He was carried into a house nearby and soon recovered consciousness, but quickly again fainted and this recurred once more. After these three attacks, which all occurred within a few hours, he felt weak and stayed in bed for several days and then returned to work. During the next few weeks he would often have attacks of dizziness, especially if he drank tea. These attacks would always be preceded by disturbance of vision and a feeling as if his

head would burst. The attacks gradually became more severe and at last he went for a holiday and they lessened. A month ago he had a very severe seizure similar to the first one and it recurred the next day and he remained unconscious for seven minutes during it. Then he had attacks every day. These would always now occur during the act of micturition. About two weeks before admission to the hospital he began to have seizures even when lying quietly in bed. He would become dazed and then find himself unconscious. Several times he fell and hurt himself, but never bit his tongue nor micturated during an attack.

Condition on admission. Patient is a dark complexioned man of wiry build and weighs 125 lbs. There are some palpable glands in the neck and the groins and in the latter situation the scar of the old bubo.

Circulatory system. There is no dyspnea and the patient lies comfortably in bed using only one pillow. Radial pulse 23 per minute, regular, and vessel not much sclerosed. The systolic blood pressure is 130 and the diastolic 80. In the neck two different pulsations are visible,—a slow one synchronous with the apex beat and a faster one, running about three times as fast as the other and evidently in the veins. The cardiac apex is visible and palpable in the fifth intercostal space in the nipple line. The heart does not seem on physical examination to be much enlarged and X-ray examination confirms this finding. In the mitral area the first sound is heard clear and strong. Also here and extending inwards for about an inch is heard a faint beating, keeping time with the venous pulse and evidently due to auricular systoles. This latter beating was much more audible on some occasions than on others. The heart sounds elsewhere were normal.

The blood examination revealed nothing abnormal and, as stated, the Wassermann reaction with the blood was not present.

Urine. Specific gravity 1015. Some albumin was present at first, but was not detected during the last two months of patient's life. A few hyaline casts were present. The prostate gland was felt to be rather enlarged, but there was no stricture.

Examination of the other systems revealed nothing abnormal.

Progress and experimental work. The "fainting attacks" were very frequent at first, occurring several times a day. They were

always connected with the act of micturition, and the patient stated that even the thought of this would sometimes precipitate one. During the seizures he would become pale and the pulse would disappear from the wrist. On one occasion the house physician, Dr. Adams, noted its absence for 48 seconds. After the unconsciousness was over the pulse would become fast and irregular. Patient several times fell and hurt himself during an attack. Although he was very amenable in most things, he could not be persuaded to take a hot bath as he said that it would certainly precipitate an attack.

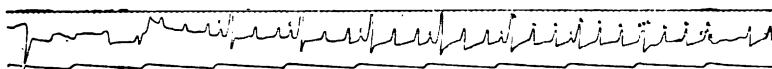


FIG. 1

Figure 1 is a polygraph tracing taken soon after admission. The ventricles were beating at 24 and the auricles at 75 per minute at the time. It shows complete disassociation between the auricles and the ventricles.

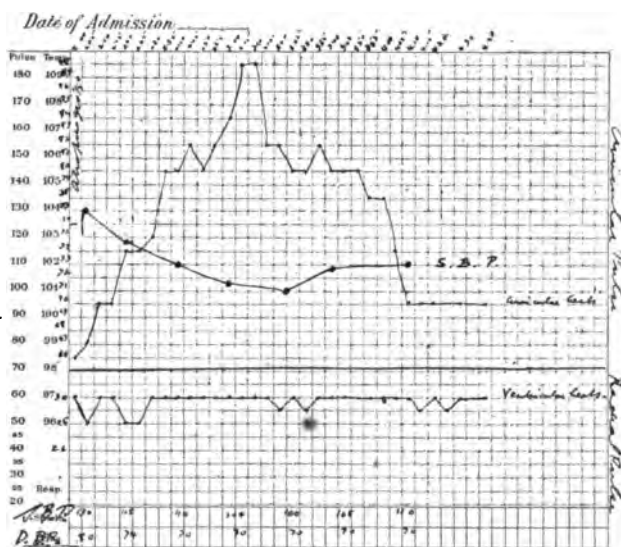


FIG. 2

Figure 2 is a pulse chart showing the effects of 1/50 grain of atropin sulphate, a dose sufficient to completely paralyze the inhibi-

We next tried the effects of nitroglycerin, giving 1/50 grain by the mouth, and taking polygraph tracings every minute. Just before the administration the ventricular pulse was 23 and the auricular 75.

2 minutes after ventricular pulse was	23	and the auricular	100
4	“	23	“ 96
5	“	23	“ 96
6	“	23	“ 94
7	“	23	“ 86
8	“	23	“ 86
9	“	23	“ 80

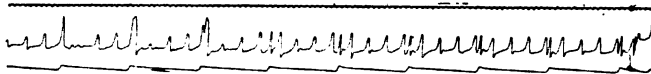


FIG 3

Figure 4 is the tracing made just before the administration and is such a good one of the circulatory condition that we do not trouble to give others made previously.

Figure 5 shows the rates four minutes after the giving of the drug and it will be seen that the auricular rate has hastened while the ventricular one remains practically unchanged. The fine vertical lines represent $1/50$ seconds and the exact counts in fiftieths of a second are here given:

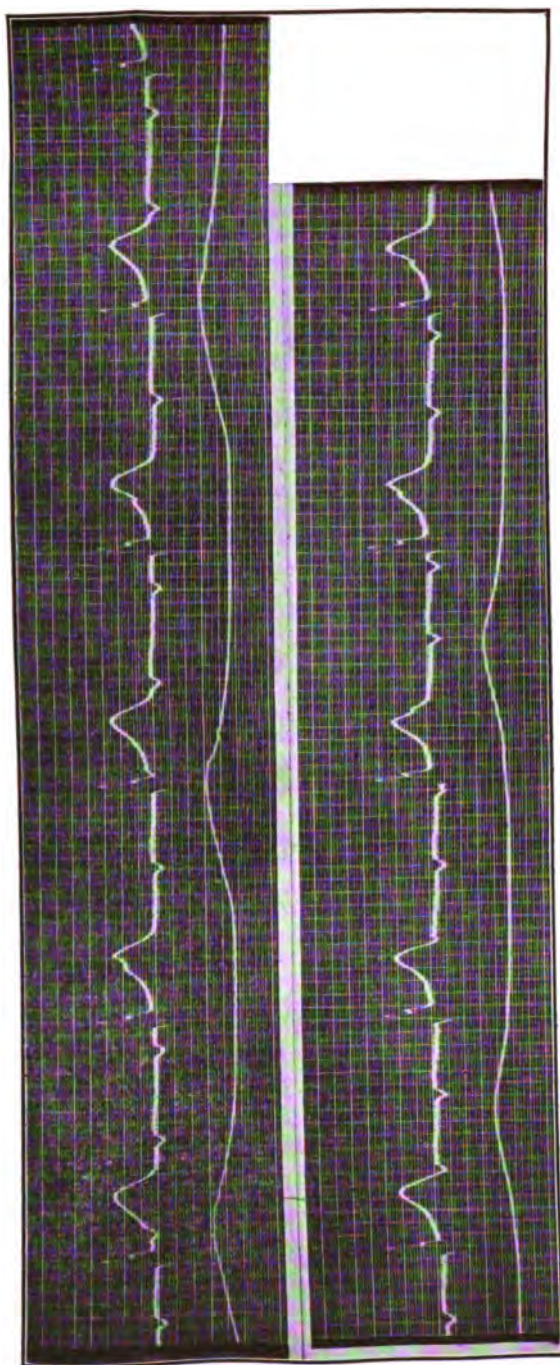


FIG 4

FIG. 5

		Auricles	Ventricles
1	minute before the nitroglycerin	37	93.5
1	after	37	93.75
2	"	33	94.25
3	"	31.5	94
4	"	29.5	92.75
5	"	30.5	91.5
6	"	29.25	91.5
8	"	29.5	91.5
10	"	31.25	92.

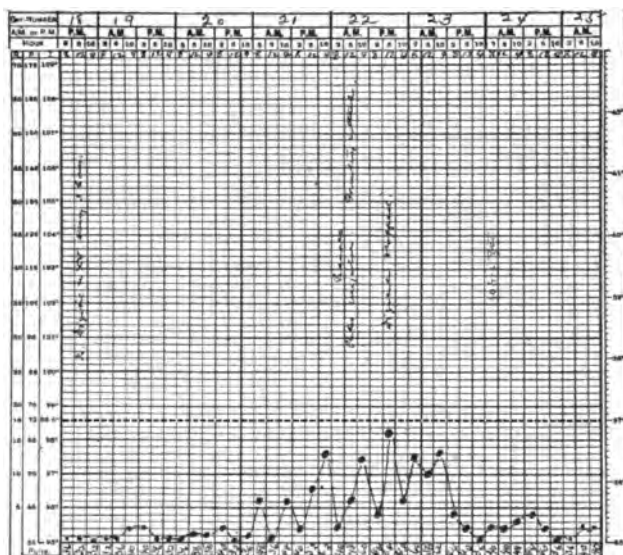


FIG. 6

Before the administration the auricles were beating at the rate of 75 and the ventricles at 32 per minute. The auricles were hastened to 103 and the ventricles to 33.3, so the latter were very slightly affected. We also tried the effects of swallowing while the electrocardiographic record was running, but the effects were too slight to be put on record. The same remark applies to the effects of prolonged breathing.

Exercise had no hastening action on the ventricular rate. The only thing that did hasten it was fever. Shortly after admission the patient had a rise of temperature to 101, apparently owing to some digestive disturbance and the pulse rate went up to 42 and remained regular. This hastening might, of course, have been due to the same cause as the fever (probably a toxemia), and we very much wished to try the effect of a pure rise in the temperature of the blood by giving the patient a hot bath, but, as already said, nothing would induce him to take one.

The action of digitalis has often been studied in connection with heart-block and many cases are on record where the ventricular rate seems to have been hastened from its use. Most of these cases are ones which have not been studied according to modern methods, but some have clearly been true cases of heart-block. Figure 6 is a chart which shows the pulse rate in a case which we took several years ago, to be one of complete heart-block. The pulse was running about 38 and he had had a number of typical Stokes-Adams seizures. Unfortunately the polygraph tracings have been mislaid. He was given tincture of digitalis in 15 minim doses every three hours and

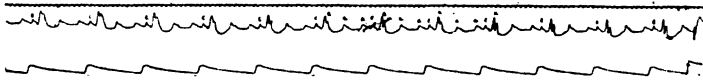


FIG. 7

on the third day the pulse rose and by the fourth had reached 68 and the patient was nauseated. The drug was then stopped and within two days the pulse rate had fallen to 38 again. In the present case we tried digitalis very thoroughly and the effect on the rate of both auricles and ventricles was practically *nil*. The drug was given in the form of digipuratum, of which the patient got three tablets a day, which represents 24 frog units each day. This dosage was kept up for 12 days and, as said, the effect on the rate was practically negative. A great improvement, however, occurred in the patient's general condition. Before the drug was given the auricles were beating at the rate of 75 per minute and the ventricles at 23 to 24. After the twelve days the auricles still were beating at 75 and the ventricles at 25 and thus a 3 to 1 ratio existed, but, as will be seen in the tracing (Figure 7) then taken, the great distance be-

tween the *r*' wave and the nearest *a* wave precludes the idea that there was any relation between them,—complete disassociation still was present. Before the digitalis was given the patient was having several "fainting attacks" daily, but during the twelve days of the administration and for two days after the drug was discontinued he was quite free of them. They then recommenced and the patient begged to have the "brown pills" again, as he said that he felt that they helped him. They were resumed twice daily, but the attacks continued and six days after the full doses had been discontinued the patient died in an attack. The day before his death I happened to see him just as he was coming out of an attack. The pulse was about

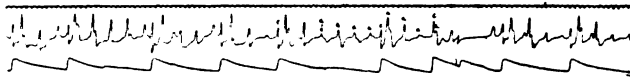


FIG. 8

70 per minute and irregular. We hastened to adjust the polygraph, but ere it was in position the rate had fallen a good deal, but the rhythm was still irregular as shown in Figure 8, and ventricular extrasystoles are seen to be occurring.

The last note made by the house-physician was as follows: March 10th, 7.45 A. M. Patient had a severe attack. It lasted for five minutes and then the respiration failed. Artificial respiration was tried but it failed to restore him and the pulse did not return. He was very cyanotic at last."

The blood pressure was taken many times during the patient's stay in the hospital and it usually ran about 140 for the systolic and 80 for the diastolic. After the digitalis had been given for 12 days the systolic pressure was 210 and the diastolic only 70. Unfortunately, owing to an oversight, this last record is a single one and hence much weight must not be placed upon this apparently great rise in the pulse pressure.

AUTOPSY REPORT

(C. W. LOUGHEAD)

General condition: Body is that of well developed adult male; cyanosis of lips and ears; pupils dilated, around each there is an

arcus senilis. Teeth poor, pyorrhea alveolaris present. Radial arteries palpable.

Peritoneal cavity: Smooth and glistening, appendix retrocecal; omentum bound down to appendix by fine fibrous adhesions; liver 2 centimeters below costal margin; gall-bladder—no adhesions.

Pleural cavities: Smooth and glistening, no adhesions.

Pericardial cavity: Contains 25 c.c. of straw-colored fluid.

Heart: weight 270 gms.

Tricuspid valve: measures 14 cm. at base, slight thickening along free edges. Running from the coronary sinus, a definite streak can be made out which appears to follow the course of the auricular-ventricular bundle.

Pulmonary valve: measures 7 cm. at base, apparently normal.

Mitral valve: measures 10 cm. at base, chronic thickening along free edges—no evidence of calcareous change present.

Aortic valve: measures 7½ cm. at base, curtains show thickening along their bases—no evidence of calcareous change present.

Coronary arteries: Right: vessel shows atheromatous change throughout its whole course. Orifice obstructed by atheromatous plaque. Left vessel shows atheromatous change—orifice apparently normal.

Lungs: Hypostatic pneumonia present, involving both lower lobes.

Liver: Weight 1700 gms. Surface smooth—central veins congested—no scarring of surface.

Kidneys: Left—capsule strips leaving a finely granular surface—cortex pale, 1 cm. in thickness. Pyramids stand out, congested. Peripelvic fat increased in amount. Right—similar to left only surface has several small cysts. Weight of both 300 gms.

Aorta: Surface of the intima covered with yellowish white patches.

Pancreas: Apparently normal.

Gastrointestinal tract: Apparently normal.

Genitourinary tract: Apparently normal—except that prostate gland is enlarged.

Block of heart removed including the membranous septum and auricular ventricular node. This was fixed and imbedded in paraffin, serial sections were made till the whole membranous septum cut. The bundle of His was completely replaced by dense fibrous tissue,

this fibrous tissue extended far into the muscle of the left ventricle and also along the endocardium of the left ventricle; this latter accounts for the whitish patch described in the gross description of the heart. In the early sections the fibrosed bundle could be made out, but farther on this bundle was completely replaced by fibrous tissue. Scattered throughout muscle there were a few small calcareous particles but they had no definite relation to the Bundle of His. (See micro-photographs, Figs. 9 and 10.)

The case is one of complete heart-block due to fibrosis of the bundle of His, apparently of non-syphilitic origin. It shows the difficulty of hastening the rate of the ventricles by agents directed toward them.

ANENCEPHALIA: WITH SPECIAL REFERENCE TO AN IMPORTANT ETIOLOGICAL FACTOR

By ALFRED GORDON

Philadelphia

The present contribution concerns an association of malformation of the brain with malformation of the cranium. It is interesting and instructive, not only from the standpoint of the rarity of its occurrence, but particularly from the point of view of a special etiological factor which alone could reasonably be incriminated here. The disturbing factor apparently carried its pernicious influence before the embryonic neural tube was fully formed. The developmental cerebral defect resulted in a cerebral monstrosity.

The anomaly belongs to the group of cerebral hypoplasia. It is a case of true and total anencephalia which also shows an embryonal involvement of the structures of the mesoblast formation, as the bones of the cranial vault are here wanting. There was evidently a pathological disturbance of the forebrain of the embryo which interfered with the development of the hemispheres.

The mechanism of these malformations was first explained by Geoffrey-St. Hilaire (*Histoire génér. et part. des anomalies de l'organisation chez l'homme et les animaux*, 1832), and his opinion is still the prevailing one. He believed that adhesions of the amnion



FIG. X

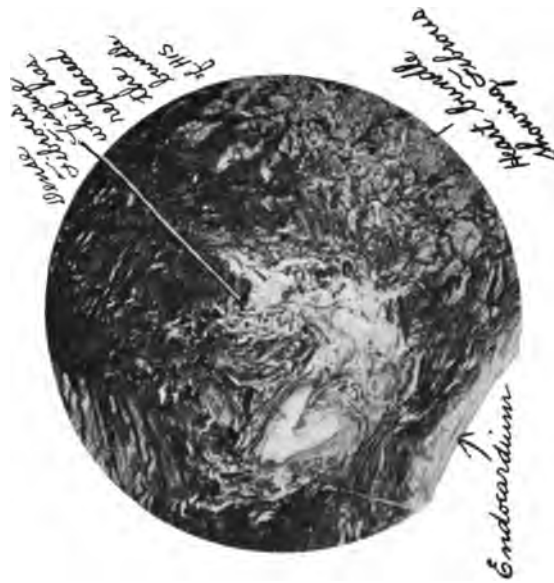


FIG. IX

CASE OF COMPLETE HEART BLOCK
R. D. Rudolf and G. W. Loughhead

to the head of the embryo exercise an injurious influence on the development of the brain and skull. In case of early adhesion before the cerebral vesicles are formed, the latter will be constricted and arrested in development; total anencephalia will be the result. This phenomenon was reproduced experimentally by Gerlach, Roux, and others.

But what produces the adhesions of the amnion is not entirely elucidated as yet. However, the majority of teratologists believe that several factors may play a certain rôle in the pathological process. They are: (1) Ependymitis, which is followed by early formation and accumulation of large quantities of fluid; (2) Diseases of the vascular system. The latter may be the result of a syphilitic transmission to the fetus, thus producing early thrombotic and necrotic changes during the evolution of the brain. Besides syphilis, any changes in the ovum, in the germ-plasm or in the embryo produced through hereditary influences are apt to be followed by an arrest of development, and therefore by malformations of any variety. In the case I am about to report, there was a special pernicious hereditary element at work.

The history is as follows: C. S., aged 38, was never ill from the day of his birth. His parents, who are still living, reached the good age of 75 (father), and 60 (mother). They do not recall having ever been seriously ill. They had eight children, all living and in good health; they are all married, and have healthy children. The present subject, up to the age of 23 had always been of good habits, he did not use alcohol or tobacco in any form. He had no sexual intercourse until the day of his marriage, and thus did not expose himself to direct venereal infection. At 22, he was married to a refined young girl coming from a very healthy stock, whom the writer knew for a number of years. Longevity has been a marked characteristic of the latter's relatives. Soon after marriage, C. S., possessing considerable wealth and leisure, became somewhat careless about his domestic duties, and absented himself frequently from home, spending his time drinking in clubs. Having been formerly a total abstainer, he now would become most easily intoxicated from the smallest amount of alcohol. His wife now became pregnant. He continued to drink for several months. The amount of alcohol consumed by him was comparatively small. He would take one or

two drinks of whiskey, three or four times a week, but the effect of it would be extraordinarily severe on him; considerable mental hebetude with distinct motor incoordination would follow each drink, besides the gastrointestinal disorder which was also very distressing. He then became ill. Alcohol was withdrawn. At that time, his wife gave birth to her first child, three months prematurely. The child died twenty-four hours later. The patient discontinued the use of alcohol during the following year. In the meantime his wife became pregnant again and gave birth to a normal child born at term. The child is living and in excellent health. Soon, the father, influenced by certain friends, returned to the pernicious habit. He commenced to drink and again it was observed that very small quantities would have a rapid effect on him. His wife became pregnant, but on the third month her pregnancy was interrupted by an abortion. He was then induced to discontinue the use of alcohol, which he did for two subsequent years. No pregnancy occurred during that time. Soon C. S. resumed his former habit and continued it for six months. During that time his wife conceived with the result of another miscarriage of three months. The patient again discontinued the use of alcohol for the following two years. No pregnancy occurred this time. A return to alcohol soon took place; his wife became pregnant, and at the seventh month, a dead child was born with the cranial cavity exposed (see illustration). This occurred three years ago. Since that time the patient has not used alcohol. Pregnancy occurred again and his wife gave birth to a healthy child who is still living.

To sum up, we observe in this case a history of several miscarriages which all occurred during the period of the use of alcohol by one of the parents, and of pregnancies which were followed by the birth of two living children when that parent discontinued the use of alcohol. In view of the repeated miscarriages a question naturally arose as to the possibility of the existence of other inherited or acquired factors in either of the parents.

Accordingly, a careful inquiry was made, and as it was mentioned above, the previous medical histories of both parents and of their respective relatives revealed unusual clear records, no constitutional disease could be traced and the longevity in both families was conspicuous. Neither of the parents was ever ill; even in

THE ARCHIVES OF DIAGNOSIS



ANENCEPHALIA
Alfred Gordon

childhood they did not suffer with any of the affections common to children.

However, the question of syphilis remained to be decided. Accordingly, a test for the Wassermann reaction was made on the young man. The blood serum and the cerebrospinal fluid were both examined, and both proved to be negative. The Noguchi test was equally negative. A second serological examination was recently made, and again the result was negative. For rigorous scientific deductions it would have been necessary to perform the same serological tests on the wife, but she declined to submit herself to such tests. However, in her case, there was no reason whatever to suspect a syphilitic infection. Her intelligent father consented to permit a Wassermann test to be made on himself for the purpose of eliminating a certain possibility of inherited syphilis. The result was negative in the blood serum and cerebrospinal fluid. Besides, all his seven children whom the writer knows, have been in excellent health, and their mother never had a miscarriage. The latter, however, refused to submit herself to a Wassermann test. Although the investigation could not be carried out in an absolutely complete manner, nevertheless, there are highly sufficient grounds to exclude syphilis or any other constitutionally morbid state that could account for the multiple miscarriages. It seems convincingly evident from a careful reading of the history of the case that alcoholic intoxication could be incriminated as a direct and only causative factor. The morphological malformation of the brain in the last prematurely born infant is only another manifestation of the effect of alcoholic intoxication on the germ cells.

Experimental investigations have proven beyond doubt that ethyl alcohol, taken in any form and allowed to act for any time, can produce germ-plasm deterioration which may influence many generations of descendants. These changes are multiple, ranging from an ordinary nervous disturbance to anomalies and defects involving embryonal development of various organs and to the production of fetuses which die in utero. These manifestations have been designated by Förel as blastophthoria, meaning "injury to the germ-plasm."

The present case is valuable from the standpoint of the direct effect of parental alcoholism on the progeniture. As syphilis can

very reasonably be excluded from the etiology, alcohol can be directly incriminated as the sole causative factor in the blastophthoria which we witness here. The damage to the germ-plasm has been unusually great, as it involved exclusively the embryonic cellular elements which serve the formation of the most important, most delicate, and most complex structures of the future child, without which life is impossible, viz., the brain. The occurrence of pregnancies followed by abortions only during the alcoholic intoxication of one of the parents renders the present contribution very valuable for the study of the important problem of alcoholism. The specimen presents a skull which was not closed or rather incompletely developed. The parietal and frontal bones are entirely absent. The open space is filled with several cystic formations of dark color, in which fluctuations are easily produced. There is no resemblance to cerebral tissue. The walls of these fluid-containing pouches resemble meningeal membranes. Their individual size is small, their upper surface does not overlap the upper border of the cranial cavity. Some of them are covered with hair. The orbital regions are naturally deformed, the left eye is less open than the right. The rest of the body, the four limbs, and the genitalia are perfectly well formed. Both testicles are found in the scrotum. In order to preserve the entire specimen intact, no dissection had been made, and it is impossible to say whether the malformation affected other portions of the cerebrospinal axis besides the cerebrum.

STUDY OF THE DEFORMITY CURVES IN TUBERCULOSIS OF THE SPINE, WITH SPECIAL REFERENCE TO OPERATIVE PROCEDURE.*

By WALTER TRUSLOW

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The progress of a patient with tuberculosis of the spine is marked by changes in the general condition of the patient, in various symptoms which we are all familiar with and in the deformity. Recogn-

* Read at a regular meeting of the N. Y. Acad. of Medicine (Orthopedic Section), Jan. 16, 1914.

nizing that the general condition of the patient is the most important consideration in treatment, we as orthopedic surgeons, nevertheless, lay great stress upon prevention of deformity; in many cases we believe that we have seen lessening of existing deformity. The high place which we have given to this factor has led to various mechanical methods of treatment.

Are we careful enough to record the deformities and do we sufficiently study them? This paper outlines a method, somewhat laborious, but requiring simple apparatus, and which in the writer's hands has led to more exact treatment.

The methods here outlined were started some years before the use of the surgical procedures of Hibbs and of Albee were presented; but the performance by the writer of the bone transplantation operation, and the increased belief in the importance of careful measurement of the post-operative cases has led to greater definiteness. This subject is presented, also, to emphasize that some such exact study of patients with spinal deformity is of value no matter what method of treatment is used.

Of 8 patients upon which the writer has performed the Albee operation, but 2 are presented to-night, as upon these only has there been opportunity to make this careful study. Both of them were under the writer's care for several years previous to the operation. Both of them had a variation of the usual forms of treatment—Bradford frame, corrective plaster jackets and braces—and both of them progressed satisfactorily as we used standards before the introduction of the operative procedures. Both of them were kept in bed for 6 to 8 weeks immediately following the operation and upon neither of them has there been placed post-operative support involving the kyphose. But in the case of each, after a period of several months of no support, the writer has applied a light celluloid corset to support the compensatory lumbar curves. The reasons for this will develop in the paper.

The method of measurement consists simply in obtaining a graphic tracing of the spines from seventh cervical spine to gluteal fold, the transference of this to standard cross-section millimeter paper, the construction of chords across the bases of the tracings of the lumbar and of the dorsal curves, and of perpendicular lines, connecting these chords with the points of greatest deviation from them,

on the curves. For the tracings from prone lying, the flexible lead-tape may be used, although the writer has felt that he has obtained greater accuracy by using the Elkington scoliometer. This consists of 30 small wooden rods, each 8 inches long and freely sliding between two strong pieces of wood each about 2 feet long and fixed with set-pieces, to hold the parallel sliding rods in the positions

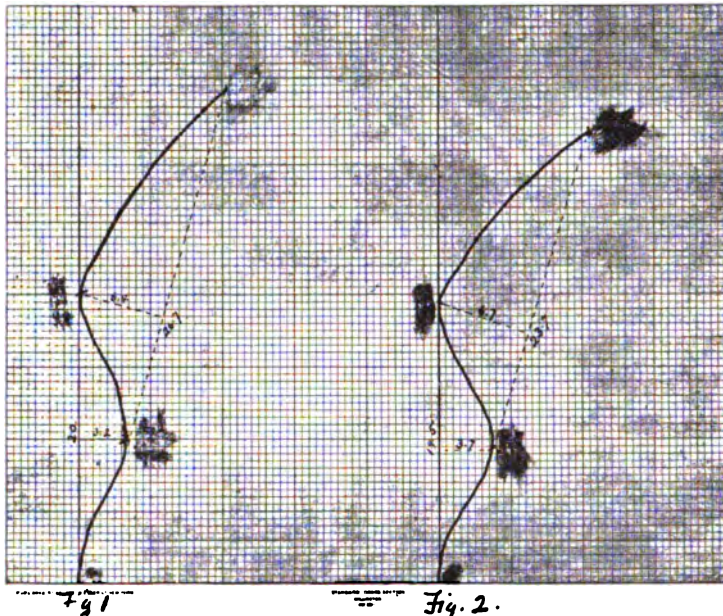


FIG. 1, CASE I., F. S., JUNE 8, 1912. PRONE LYING, BEFORE OPERATION

$$\text{Lumbar: } \frac{3.2}{20} = .1600 \text{ or } 16\% \quad \text{Dorsal: } \frac{6.4}{26.7} = .2400 \text{ or } 24\%$$

FIG. 2, CASE I., OCT. 4, 1912. PRONE LYING, AFTER OPERATION

$$\text{Lumbar: } \frac{3.7}{19.5} = .1900 \text{ or } 19\% \quad \text{Dorsal: } \frac{6.7}{23.7} = .2827 \text{ or } 28\frac{1}{4}\%$$

which the body contour give them. For the tracing in the standing position, this apparatus has seemed essential to the writer, as he wishes to transfer not only the curves in relation to each other, but the entire back contour in relation to the line of gravity of the body.

The tracing transferred to the cross-section millimeter paper and the chords of the curves and their perpendicular lines marked, these chords and these perpendicular distances are measured in centi-

meters and fractions of a centimeter, as follows: (See Fig. 1.) The perpendicular distance is the denominator and its chord distance the numerator of a fraction, which when reduced to the decimal fraction, gives the ratio of antero-posterior deviation of the lumbar and dorsal curves respectively. It is the constant comparison of the ratios of successive curves, taken at reasonable intervals of time, that determines for the surgeon whether the patient is improving or otherwise, and therefore, whether the treatment is mechanically efficient or not.

The two cases will be reported somewhat in detail from this point of view only.

Case I.—F. S.—Mid-dorsal Pott's—Now 17 years old. Onset at 3 years of age. First seen by the writer at 12 years of age—marked dorsal deformity and lumbar compensatory lordosis. There was no satisfactory record of deformity until June, 1912, but previous to that time treatment had been by means of corrective jackets and braces and the boy's condition had progressed reasonably satisfactorily.

All early tracings were taken in prone lying position only.

8 June, 1912. Fig. 1:

Lumbar $\frac{3.2}{20} = .1600$ or 16%; Dorsal $\frac{6.4}{26.7} = .2397$ or 24%.

30 July, 1912. Operation at Kings County Hospital—bone transplantation from crest of tibia into prepared groove in dorsal spinous processes (Albee's operation). In bed 6 weeks. Patient was up for 4 more weeks unsupported, before next tracing was made.

4 Oct., 1912. Fig. 2 (prone lying): Lumbar $\frac{3.7}{19.5} = .1897$ or 19%; Dorsal $\frac{6.7}{23.7} = .2827$ or 28¼%.

(History comment: Both curves show increase, yet decide not to add artificial support.)

8 Nov., 1912. Fig. 3 (prone lying): Lumbar $\frac{3.2}{21.1} = .1516$ or 15⅛%; Dorsal $\frac{6.4}{25.2} = .2540$ or 25½%.

(History comment: Both curves lessening again, but lumbar support is not satisfactory. Started muscle development of abdomen.)

15 Feb., 1913. Fig. 4 (prone lying): Lumbar $\frac{3.7}{19.4} = .1907$ or 19%; Dorsal $\frac{6.7}{26.5} = .2528$ or 25¼%.

(History comment: Lordosis—compensatory—is increasing; kyphose slightly. So much *upper trunk body-weight* is *carried back* of *line of gravity* of the body, that this increase of curves seems inevitable; the figures do *not* necessarily indicate that the bone-graft is inefficient.)

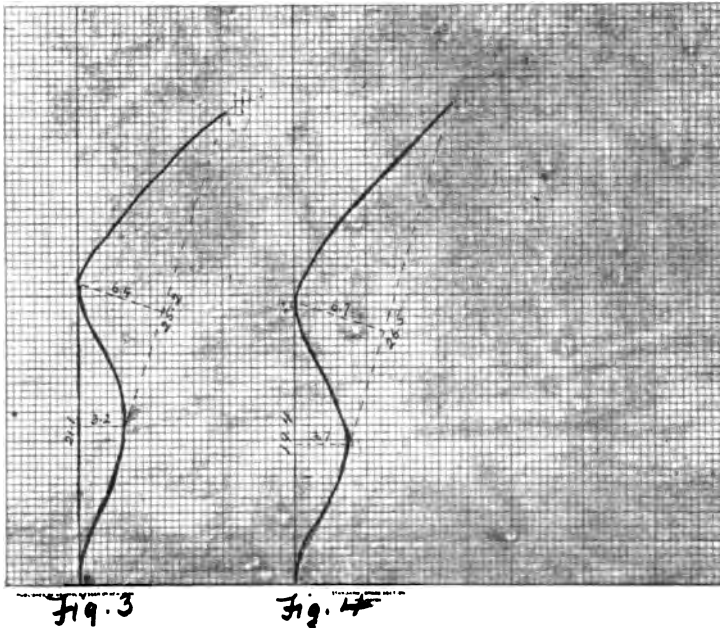


FIG. 3, CASE I., NOV. 8, 1912. PRONE LYING, AFTER OPERATION

Lumbar: $\frac{3.2}{21.1} = .1516$ or 15⅛% Dorsal: $\frac{6.4}{25.2} = .2540$ or 25⅜%

FIG. 4, CASE I., FEB. 15, 1913. PRONE LYING, AFTER OPERATION

Lumbar: $\frac{3.7}{19.4} = .1907$ or 19% Dorsal: $\frac{6.7}{26.5} = .2528$ or 25¼%

21 Feb., 1913. Plaster of Paris jacket applied from kyphose level to trochanters, the patient standing with trunk prone to lessen lordosis. (See Fig. 5.)

(History comment: This does *not* support the kyphose, but does support the abdomen, and thus the lumbar spine; and the patient, on standing, carries all of this trunk-weight more nearly in approximation to the line of gravity of the body. Will this eventually lessen the spinal curves?)

11 Apr., 1913. Plaster jacket removed. Fig. 6 (prone lying): Lumbar $\frac{2.3}{19} = .1211$ or $12\frac{1}{8}\%$; Dorsal $\frac{5.9}{30} = .1966$ or $19\frac{2}{3}\%$. Fig. 7 (standing): Lumbar $\frac{3.5}{18.5} = .1881$ or $18\frac{5}{8}\%$; Dorsal $\frac{6.4}{23} = .2782$ or $27\frac{5}{8}\%$.

(History comment: The comparison of prone lying curves shows marked improvement of lordosis and striking lessening of kyphosis; and would seem to indicate the value of the abdominal support. It was recognized, however, that if this improvement were to be permanent, it must hold in the standing position. The first standing

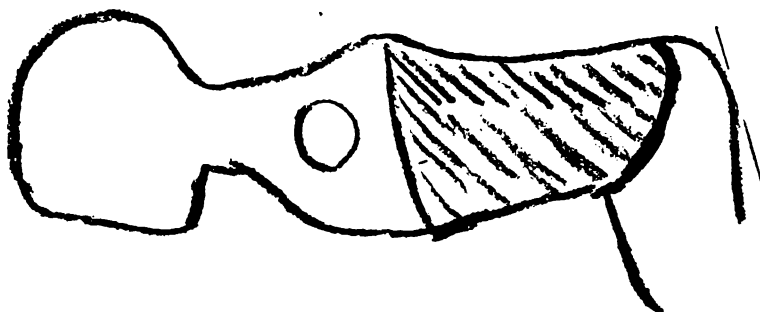


FIG. 5. CASE I. PLASTER JACKET APPLIED TO HOLD LUMBAR SPINE ONLY; PATIENT IN SEMI-PRONE POSITION TO LESSEN COMPENSATORY HOLLOW-BACK, WHILE APPLYING THE JACKET

tracing was therefore taken. Study of this seemed disappointing; but when compared with the first prone tracing after the operation, it was found that the standing ratios for each curve were now better than were the prone tracings then. The patient was, therefore, supplied with a celluloid jacket, controlling only the lumbar curve.)

16 Sept., 1913. After five months of celluloid jacket. Fig. 8,

spine (standing, without jacket): Lumbar $\frac{3.6}{21.1} = .1706$ or 17%;

Dorsal $\frac{6.9}{23} = .3000$ or 30%.

(History comment: This indicates improvement in lumbar spine and slight increase in dorsal curve. Is the jacket holding?)

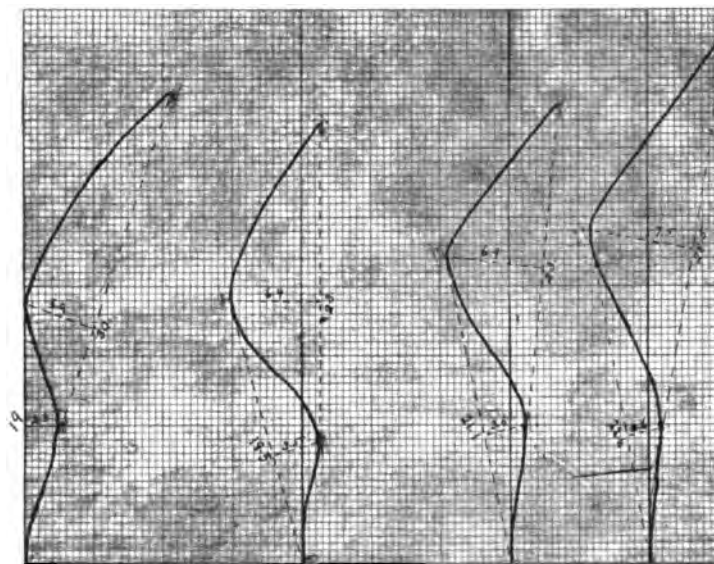


Fig 6

Fig 7-

Fig 8

Fig 9-

FIG. 6, CASE I., APRIL 11, 1913. PRONE LYING, AFTER OPERATION

Lumbar: $\frac{2.3}{19} = .1211$ or 12½% Dorsal: $\frac{5.9}{30} = .1966$ or 19⅔%

FIG. 7, CASE I., SAME DATE. STANDING

Lumbar: $\frac{3.5}{18.5} = .1881$ or 18⅝% Dorsal: $\frac{6.4}{23} = .2782$ or 27⅞%

FIG. 8, CASE I., SEPT. 16, 1913. STANDING, AFTER OPERATION

Lumbar: $\frac{3.6}{21.1} = .1706$ or 17% Dorsal: $\frac{6.9}{23} = .3000$ or 30%

FIG. 9, CASE I., SAME DATE. STANDING, WITH CELLULOID JACKET

Lumbar: $\frac{2.6}{22.6} = .1150$ or 11½% Dorsal: $\frac{7.5}{28.5} = .2631$ or 26⅓%

Fig. 9, spine (standing, with jacket): Lumbar $\frac{2.6}{22.6} = .1150$ or

11½%; Dorsal $\frac{7.5}{28.5} = .2631$ or 26⅓%.

(History comment: The jacket holds the trunk in greatly improved positions; nature may be depended on for adaptive changes.)

14 Nov., 1913. Fig. 11 (standing, without lumbar support):

Lumbar $\frac{3.6}{21.4} = .1682$ or $16\frac{5}{8}\%$; Dorsal $\frac{7.4}{24.5} = .3020$ or $30\frac{1}{4}\%$. Fig. 10 (standing, with celluloid jacket): Lumbar

$\frac{2.5}{24.5} = .1020$ or $10\frac{1}{4}\%$; Dorsal $\frac{6.9}{29.5} = .2340$ or $23\frac{2}{3}\%$.

(History comment: Practically stationary; but jacket is holding still better.)

12 Jan., 1914. Fig. 13 (standing, without support): Lumbar

$\frac{3.4}{24.8} = .1411$ or $14\frac{1}{8}\%$; Dorsal $\frac{7.}{25.8} = .2713$ or $27\frac{1}{8}\%$. Fig.

12 (standing, with celluloid jacket): Lumbar $\frac{2.8}{24.5} = .1143$ or $11\frac{1}{2}\%$; Dorsal $\frac{7.1}{30.} = .2333$ or $23\frac{1}{3}\%$.

(History comment: Improvement in both curves of the unsupported tracings. Boy is growing in height; body-weight is steadily increasing, and he has had no pain or sense of tire anywhere in the back. The writer feels that he may share the honors, for the present improvement in the posture of the patient, with the originator of the transplantation operation. He feels that the bony splint in the spinous processes has done much to *aid* the support of the upper back, but that in a case where so much upper trunk body-weight is carried back of the line of gravity of the body, the very necessities of antero-posterior body-balance will form first, increased lordosis, and second to this, increased kyphosis.

What will be the future of this case? The writer expects to follow it carefully. Theoretically, if normal body-growth, aided by proper support shall continue to lessen the curves, artificial support to the lower trunk may be gradually withdrawn.)

Case II.—E. O.—Mid-dorsal Pott's; girl, now 8 years old. Previous history—At about 3 years of age there was swellings of the fingers of the right hand, which quickly disappeared, and the deformity in the mid-dorsal spine was first noticed. Patient was first seen by the writer in February, 1909, within a few months after the

disease was first noticed. At that time there were marked kyphose and spasm of muscles on attempted hyperextension.

6 Feb., 1909 (prone lying, before operation): Lumbar $\frac{1.8}{18.4} = .0978$ or $9\frac{4}{5}\%$; Dorsal $\frac{2.5}{21.} = .1191$ or $11\frac{7}{8}\%$.

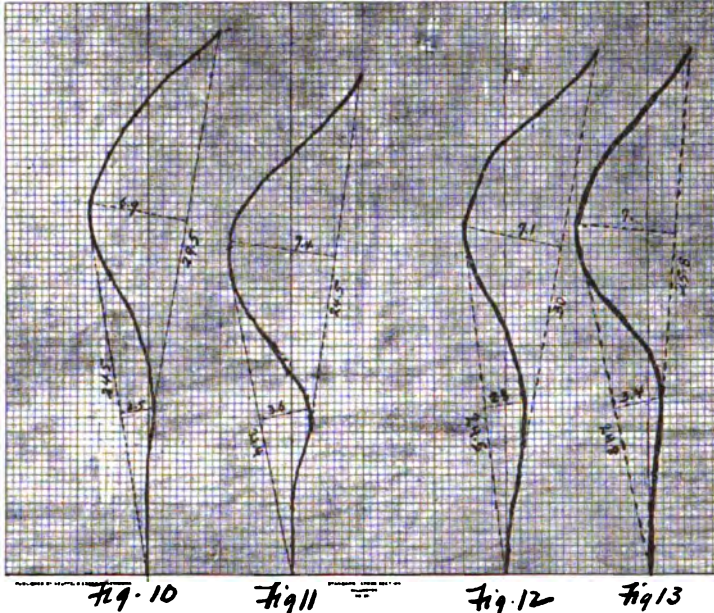


FIG. 10, CASE I., NOV. 14, 1913. STANDING, WITH CELLULOID JACKET
Lumbar: $10\frac{1}{2}\%$
Dorsal: $23\frac{3}{5}\%$

FIG. 11, CASE I., SAME DATE. STANDING, WITHOUT SUPPORT
Lumbar: $\frac{3.6}{21.4} = .1682$ or $16\frac{5}{8}\%$ Dorsal: $\frac{7.4}{24.5} = .3020$ or $30\frac{1}{5}\%$

FIG. 12, CASE I., JAN. 12, 1914. STANDING, WITH CELLULOID JACKET
Lumbar: $11\frac{1}{2}\%$
Dorsal: $23\frac{1}{3}\%$

FIG. 13, CASE I., SAME DATE. STANDING, WITHOUT SUPPORT
Lumbar: $\frac{3.4}{24.8} = .1411$ or $14\frac{1}{8}\%$ Dorsal: $\frac{7.}{25.8} = .2713$ or $27\frac{1}{8}\%$

(History comment: Patient was placed on Bradford frame, and improved rapidly in general condition.)

8 Sept., 1909 (prone lying, before operation): Lumbar $\frac{1.5}{20.4} = .0735$ or $7\frac{1}{3}\%$; Dorsal $\frac{2.4}{18.3} = .1311$ or $13\frac{1}{8}\%$.

(History comment: All spasm has ceased, lumbar curve decreased; dorsal increased. Started corrective jackets.)

11 Oct., 1910. Has worn corrective jackets, and for 5 months a spinal brace, with front frame. (Spine prone, before operation): Lumbar $\frac{2.1}{20.} = .1050$ or $10\frac{1}{2}\%$; Dorsal $\frac{2.9}{18.9} = .1534$ or $15\frac{1}{3}\%$.

(History comment: Patient does not do so well in brace as with corrective jackets. Plaster jacket reapplied in the sitting position, in Riely's kyphoclast.)

4 Apr., 1912. Plaster corrective jackets were used for 6 months. On removal (prone lying, before operation): Lumbar $\frac{2.8}{21.4} = .1309$ or 13% ; Dorsal $\frac{3.2}{19.5} = .1641$ or $16\frac{2}{5}\%$.

(History comment: There have been some pressure sores, and brace is used again, although deformity seems to be slightly increasing.)

19 Dec., 1912 (prone lying, before operation): Lumbar $\frac{2.}{22.5} = .0888$ or $8\frac{7}{8}\%$; Dorsal $\frac{4.1}{24.} = .1708$ or 17% .

(History comment: Lumbar curve is improving, but kyphose is steadily getting worse.)

8 Jan., 1913. *Operation* at Kings County Hospital; transplantation of bone-graft from tibia into spinous processes (Albee's operation). Recovery uneventful. On a frame 5 weeks.

3 Mar., 1913. Has been standing unsupported two days. (Prone lying, after operation): Lumbar $\frac{2.8}{19.3} = .1450$ or $14\frac{1}{2}\%$; Dorsal $\frac{4.7}{22.8} = .2061$ or $20\frac{2}{3}\%$.

(History comment: This shows the greatest kyphose curve at any

time presented during the child's treatment, but still decide to keep the patient unsupported for a while.)

19 Apr., 1913. (Three and a half months after operation—two and a half months walking about unsupported. Spine, prone):

$$\text{Lumbar } \frac{2.3}{19.} = .1210 \text{ or } 12\%; \text{ Dorsal } \frac{3.5}{21.3} = .1643 \text{ or } 16\frac{1}{2}\%.$$

(History comment: This shows improvement in both curves, but it is recognized that it is necessary to watch the standing position.)

Same date, spine (standing): Lumbar $\frac{3.2}{20.} = .1600$ or 16%;

$$\text{Dorsal } \frac{5.1}{21.} = .2428 \text{ or } 24\frac{1}{4}\%.$$

(History comment: Started exercises to develop abdominal muscles and upper back and shoulder retracting muscles.)

19 May, 1913, spine (standing), still unsupported, after operation: Lumbar $\frac{3.2}{19.} = .1684$ or $16\frac{7}{8}\%$; Dorsal $\frac{5.4}{22.} = .2454$ or $24\frac{1}{2}\%$.

(History comment: Both curves are increasing. Applied celluloid jacket, supporting lower trunk only).

26 Sept., 1913. Four months of low trunk support. Spine (standing), unsupported: Lumbar $\frac{2.5}{19.8} = .1313$ or $13\frac{1}{8}\%$; Dorsal $\frac{6.5}{24.} = .2708$ or 27%.

(History comment: This seems to indicate increasing sag of the pathological curve, but spine standing with celluloid jacket: Lumbar $\frac{2.5}{21.2} = .1179$ or $11\frac{1}{4}\%$; Dorsal $\frac{5.2}{24.5} = .2122$ or $21\frac{1}{4}\%$, show that the brace is supporting the abdomen, is keeping the trunk more nearly toward the line of gravity of the body, and, in the absence of adverse symptoms, nature may be depended upon for adaptive changes.)

10 Jan., 1914, spine (standing) without support: Lumbar $\frac{3.8}{20.5} = .1853$ or $18\frac{1}{2}\%$; Dorsal $\frac{5.2}{21.4} = .2438$ or $24\frac{1}{3}\%$.

(History comment: This shows slight improvement in the pathological curve, but considerable increase in the lordosis. It is found,

however, that the child is growing rapidly, and the distance from her pelvis to the kyphose has increased 2 inches, whereas no lengthening has been made to the brace, and it is not, therefore, properly supporting the lower trunk. A change will be made so that, with extensible uprights, the brace will follow the child's growth.)

With Case II, only 12 months have elapsed since the operation, but it is felt that this patient, also, is progressing satisfactorily, and, that the post-operative spinal support is necessary as an adjunct to the bone-splinting support.

Throughout the post-operative history of both of these cases there have been no adverse symptoms, there has been no pain, and both patients have steadily increased in body-weight and have shown spinal growth. But the writer feels that sagging of the lumbar spine and secondary slump of the dorsal spine were inevitable unless low trunk support had been given these cases; and that only by means of the careful studies of his tracings could he know the mechanical conditions of the patients, and when and how to give the support. These cases are not presented as speaking for or against the operation, *but only to describe a method of observation*, and to urge its importance in the supervision of all cases of tuberculous spine deformity. Merely as a corollary to this study, the writer would state that in these two cases, he believes that the bone-graft has been efficient to aid in the support of the pathological curve under weight-bearing; that the outside support of the secondary or lumbar curve has so altered the patient's body-carriage as to reduce to a minimum the gravity strain upon the pathological curve, and that adaptive changes incidental to growth have been and will continue to be operative in further reducing the deformity. The writer unqualifiedly believes that the orthopedic surgeon's after-care of operative cases must be just as rigid and for as long a period as it was before the operation.

Progress of Diagnosis and Prognosis

GENERAL METHODS OF EXAMINATION—SYSTEMIC AFFECTIONS—DISORDERS OF GENERAL METABOLISM

Glycemia in Normal and Pathological Conditions—H. J. BING and B. JACOBSEN, *Deutsches Archiv f. klin. Medizin*, Vol. CXIII, Nos. 5 and 6.

The normal blood-sugar percentage amounts on the average to 0.1 (0.06—0.12). After ingestion of 100 grams glucose the percentage of the blood-sugar is mostly increased during the subsequent hours. This augmentation is varying in different persons. A similar increase is also noted after an ordinary meal. Hyperglycemia ensues frequently in renal disease; it is independent of the blood pressure increase and is caused by complications. Authors did not encounter hyperglycemia in various cases of gastric disease, neurasthenia and hyperthyroidism; in pancreatic disease, however, hyperglycemia was met with. In diabetes mellitus the blood-sugar was generally increased; this was the case while fasting and after ingestion of food. There is no direct ratio between hyperglycemia and glycosuria; this indicates the import of the renal factor. In cases of glycosuria and diabetes mellitus, in which the glycosuria was rare and insignificant, the examination of the blood for sugar proved to be a good diagnostic and prognostic means. WESTERN.

Blood-Sugar in the Nursling—G. MCGWITZ, *Monatsschr. f. Kinderheilkunde*, Vol. XII, No. 9.

The amount of blood-sugar in the healthy nursling fluctuates between 0.07 and 0.11 per cent. The influence of the diet upon the normal glycemia is noticeable in a moderate degree after the ingestion of considerable carbohydrate material in the form of either sugar or starch. When fasting the glycemia declines after from 24 to 30 hours and gradually diminishes to about half its normal degree. There ensues a transitory hyperglycemia after the first few meals that follow a fasting period. Psychic irritations in the child exert no influence upon the sugar content of the blood. In the nutritionally disturbed nursling there is the tendency to maintain the normal degree of glycemia; this is the case in acute as well as in chronic affections. It is only in severe diseases which have already caused atrophy that the blood-sugar is diminished in a slight degree; as soon, however, as reparation ensues, the glycemia regains its normal degree. MILL.

Lymphocytosis and its Diagnostic Overestimation—G. HUHLE, *Deutsches Archiv f. klin. Medizin*, Vol. CXIII, Nos. 5 and 6.

An absolute lymphocytosis is said to exist if more than 2000 lymphocytes are contained in 1 c.c. of blood. A relative lymphocytosis is present if among 100 white blood cells more than 30 are lymphocytes. Lymphocytosis is present in the most discrepant febrile and afebrile states, especially in neurasthenia and asthenia, but no specific import can be attached to this phenomenon.

WESTERN.

Cerebrospinal Fluid Examination—M. E. MORSE, *Boston Med. and Surg. Jour.*, March 12, 1914.

Author found that in 71 per cent. of 80 cases in whom the diagnosis or paresis was definitely made, or in whom a suspicion of it was entertained, an examination of the serum and cerebrospinal fluid was confirmatory. In 60 cases in whom the diagnosis was definitely made, it seems to be substantiated by serologic and cytologic evidence in 83 per cent. Cerebral syphilis, arteriosclerosis, and Koraskow's psychosis, are the most difficult diseases to differentiate from paresis without examination of the serum and cerebrospinal fluid.

SACHS.

Fatal Illness in Infants with Status Lymphaticus—C. M'NEIL, *Edinburgh Med. Jour.*, Jan., 1914.

In a group of 13 infants from 2 to 4 months old, nearly all found dead in bed, and all apparently well-developed and nourished, the lungs in every case examined (8), showed marked congestion, bronchitis, and bronchopneumonia. This was associated in most cases with hyperplasia, general or partial, of the thymo-lymphatic system. The same pathological grouping was found in all cases examined of a very unusual series of fulminant bronchopneumonia in boys from 10 to 16 years old. There is some evidence that fulminant types of other bacterial infections (scarlet fever and diphtheria) are also accompanied by thymo-lymphatic hyperplasia, or status lymphaticus. In the two groups of fulminant pneumonia, thyroid hyperplasia was present in every case examined (18).

SACHS.

Hemochromatosis Resembling the Clinical Picture of Addison's Disease—J. NAKANO, *Münchener med. Wochenschr.*, April 28, 1914.

Detailed study of a case resembling clinically and necroscopically one of bronze-diabetes without glycosuria. Author draws the conclusion that there are disease conditions other than bronze-diabetes the grave clinical picture of which, resembling that of Addison's disease, concurs with pigmentations and cirrhotic processes in the liver and pancreas, but is not associated with glycosuria. MILL.

Dentition and Hair-Development as Influenced by the Internal Secretion—A. JOSEFSON, *Deutsches Archiv f. klin. Medizin*, Vol. CXIII, Nos. 5 and 6.

Dentition, hair-development and body-length are dependent on the influence of the internal secretion; they are an expression of the concerted activity of the entire endocrinal glandular system. During pregnancy the internal secretion of the mother is overtaxed; enlargement of the thyroid and increase in weight of the hypophysis during pregnancy point to a functional disturbance. In case the endocrinal secretion does not suffice the development of the embryo is interfered with. Organotherapy instituted during pregnancy may influence certain familial predispositions; disturbances in dentition and hair-development may also be influenced by organotherapeutics.

WESTERN.

Eunuchoidism.—Familial Developmental Disturbances of the Glands withInternal Secretion—K. GOLDSTEIN, *Archiv f. Psychiatrie u. Nervenkrankheiten*, Vol. LIII, No. 2, 1914.

There is a syndrome depending upon congenital underfunction or absence of function of the glandular apparatus with internal secretion. On account of the affection of diverse glands and the various degrees of underfunction the symptom-complexes may be rather discrepant; all, however, must be regarded as manifestations of one and the same basic disorder. Thus there may be eunuchoid giant growth, at other times eunuchoid fatty growth, and at other times myxedematous states, etc. Hypoplasia of the glands concurs with hypoplasia of the brain. The affection bears a strongly familial character. Report of 4 pertaining cases.

WESTERN.

Symptomatology of Substernal Goiter—K. ENGEL and R. HOLITSCH, *Wiener klin. Wochenschr.*, April 23, 1914.

Substernal goiter may be recognized by the possibility of displacing the dulness over and at the side of the manubrium sterni during the act of deglutition. This displaceability often corresponds to that of the X-ray shadow. Absence of this sign does not speak with certainty against the presence of substernal goiter, especially when this is not readily movable.

MILL.

Tuberculous Origin of the Thyroses—J. HOLLOS, *Zeitschr. f. Tuberkulose*, Vol. XXII, No. 1.

Report of 28 cases that demonstrates the relationship between thyrotoxicosis and tuberculosis. Author concludes that tuberculosis plays the most important rôle in the etiology of the thyroses.

FRY.

Morphological Properties of the Blood in Diabetes Mellitus—M. HALPERN, *Berliner klin. Wochenschr.*, March 2, 1914.

The presence of lymphocytosis in diabetes is of no clinical import as far as we know at the present time. This is the case in

diagnostic as well as in prognostic respects. At the same time the occurrence of lymphocytosis is a very interesting phenomenon from the theoretical viewpoint, as it undoubtedly stands in some connection with the internal secretions in their association with the pathogenesis of diabetes.

MILL.

Infection and Diabetes—C. FUNK, *Beiträge z. Klinik d. Infektionskrankheiten u. z. Immunitätsforschung*, Vol. II, No. 3.

An existing infection may be a co-factor in the production of diabetes. Febrile infections are frequently accompanied by hyperglycemia. Glycosuria and diabetes may be called forth by an infection or by a factor contributing toward the infective process. Diabetes and glycosuria may decrease when an infection has supervened, and the sugar-excretion may occasionally cease for a shorter or longer period.

WESTERN.

Hepatic Diabetes—M. LABRE and A. BOUCHAGE, *Lancet*, Jan. 3, 1914.

Hepatic diabetes usually occurs in heavy eaters and is often antedated by obesity and occasionally by gout and renal lithiasis. Hypertrophy of the liver, subicteric complexion, and the presence in the urine of excess of biliary pigments, of brownish-red pigment, of urobilin, of ammonia, and the amino-acids are accompaniments of this condition. These patients are prone to have hemorrhages and disturbances due to blood-coagulation. Authors give general infections that attack the liver, intoxications such as by alcohol, which has an affinity for the liver cells, and more often overfeeding with meat, as causes of this disturbance.

SACHS.

Mutual Relationship between Nervous System and Diabetes Mellitus—P. ZAGOROWSKY, *Zeitschr. f. experiment. Pathologie u. Therapie*, Vol. XV, No. 2.

An injury or any irritation of the celiac plexus gives rise to a transitory as well as an enduring glycosuria. In diabetes the celiac plexus is primarily diseased; the alterations in the islands of Langerhans are of secondary development. The unknown agents circulating in the diabetic blood affect the central nervous system. The injury of the central nervous system is limited to its parenchymatous portions.

WESTERN.

Chronic Arthritis—F. L. BARKER, *Am. Jour. Med. Sci.*, Jan., 1914.

As a tentative classification of the principal diseases grouped under the designation chronic arthritis, the following rubrics would seem to be, at present, most useful. I. The true gouty arthropathies (*A. chronica urica*). II. The arthropathies for severe nervous disease (*A. tabidorum*; *A. syringomyelica*). III. The (primary) hypertrophic osteoarthropathies (*osteoarthritis hypertrophicans* or

osteoarthritis deformans), a relatively benign affection. IV. The secondary chronic arthropathies, following various infections (*A. luetica*, *A. tuberculosa*, *A. chronica gonorrhoeica*, *A. chronica rheumatica*, if it exist, etc.), and those following small foci of infection (microorganisms often unknown) in various parts of the body. V. The so-called (primary) chronic progressive polyarthritis—of all arthropathies the most malign. In relation to the above 5 headings, mention must be made of several special conditions; namely: (a) The villous arthritis of Goldthwaite; (b) The chronic arthropathies of the spine; (c) Still's disease; (d) Heberden's nodes; (e) Bouchard's comptodactylie; (f) Subcutaneous fibroid nodules. SACHS.

INFECTIOUS DISEASES

Increasing Accuracy of Wassermann Reaction—F. H. THIELE and D. EMBLETON, *Lancet*, Feb. 21, 1914.

By means of author's method, cases of syphilis which would otherwise give a reaction so slight as to be doubtful, give a full fixation; cases which would ordinarily give a negative result can be made to give a full reaction, so bringing forth a number of latent cases. To increase the delicacy of the Wassermann reaction, the amount of the complement used is diminished to one and a half times, only, that which will cause complete hemolysis of the system adopted. Large amounts, 0.5 c.c. or more, of inactivated syphilitic serum are used, and 50 to 100 units of the antigen. By this method purely anticomplementary phenomena do not play a part. SACHS.

Scarlet Fever and the Wassermann Reaction—B. JAKOBOVICS, *Jahrbuch f. Kinderheilkunde*, Vol. LXXIX, No. 2.

In grave cases of scarlet fever the Wassermann reaction proved positive after the complete decline of the acute symptoms. The positivity lasts but rarely longer than the disease. Etiologically the positive Wassermann reaction does not permit of any conclusions. MILL.

Diazo- and Russo- Reactions in Pulmonary Tuberculosis—H. H. THOMSON, *Practitioner* (London), Jan., 1914.

Russo's methylene-blue reaction has been employed in cases of enteric fever. The test is applied by adding 2 or 3 drops of a 1:1000 solution of methylene-blue to a small quantity of urine in a test tube. When the reaction is positive, the solution changes from a peacock-blue to an emerald-green color which varies in intensity. A positive Russo reaction is almost invariably associated with a positive diazo

reaction, but the latter may also be positive with a negative methylene-blue reaction. A persistent diazo-reaction, or a combined diazo- and Russo reaction occurring in pulmonary tuberculosis of recent onset is a sign of serious significance. The disappearance of the diazo-reaction is usually associated with general improvement. A negative Russo reaction is an indication of severe systemic intoxication, and contraindicates treatment by induced auto-inoculation, or by tuberculin.

SACHS.

The Percutaneous Tuberculin Reaction—A. J. B. LECKIE, *Lancet*, Jan. 31, 1914.

The percutaneous diagnostic reaction, introduced by Moro and Doganoff, is a modification of the use of the tuberculin ointment employed by Spengler as a therapeutic measure. The ointment is exceedingly inaccurate. It does not give nearly so many reactions in non-tuberculous cases as does the von Pirquet test. Most reactions are obtained in women and children. The test is of no value in prognosis. It more often fails in tuberculous cases than the cutaneous reaction. Late reactions have no clinical significance. Tuberculous cases which respond to the ointment also react to the von Pirquet method. Pyrexia does not interfere with the reaction and the test is free from danger.

SACHS.

Blood Examinations in Pulmonary Tuberculosis—H. SCHWERMANN, *Zeitschr. f. Tuberkulose*, Vol. XXII, No. 1.

Pulmonary tuberculosis does not exert a definite influence upon the number of leukocytes. The eosinophiles show nothing that could be interpreted as being characteristic of tuberculosis. In many cases of the affection there exists lymphocytosis, that is often quite marked.

FRY.

Axillary Lymphnodes and Pulmonary Tuberculosis—WIETING, *Zentralblatt f. Chirurgie*, No. 15, 1914.

The axillary lymphnodes are enlarged in incipient apical tuberculosis. The glands become infected secondarily as soon as the pleuræ are adherent to the apices.

MILL.

Tuberculosis of the Breast—J. B. DEEVER, *Am. Jour. Med. Sci.*, Feb., 1914.

The most frequent initial symptom of tuberculous mastitis is a painless lump. In 78 per cent. of the malignant, and in 86 per cent. of the benign mammary neoplasms operated on by the author, this was likewise the first sign of the disease. Pain occurs not infrequently during the course of the disease. Any patient presenting a lump in the breast and complaining of pain on respiration in the region of the tumor should be skiagraphed for osteitis of the under-

lying ribs. Retraction of the nipple was rated by Dubrueil, Verneuil, and Warden, as the first indication of tuberculosis of the breast occurring in their cases, 11 months, 2 years, and 5 years before a mass was palpable. The average duration of the disease in the primary cases was 10.1 months, in the secondary cases 11.2 months. Tuberculosis of the breast runs a much more rapid course than carcinoma of the breast. The rapidity of the disease process, changes in the size and consistence of the tumor mass, early fistula formation, early involvement of the axillary lymphatics, and in a few instances pain, bring the great majority of the subjects of tuberculous mastitis to the surgeon within the first year of the disease.

SACHS.

Lingual Tuberculosis—W. B. TRIMBLE, N. Y. Med. Jour., Mar. 7, 1914.

Author describes two cases. Tuberculous ulcers of the tongue usually affect the free border near the tip; the dorsum is generally free; they are as a rule superficial; the base is generally a dirty yellow, dotted here and there with minute whitish specks, which probably represent small areas of caseation-necrosis; the ulcer may be oval or gyrate, but the borders are generally sharply defined against the healthy tissues, sloping and not undermined; the lesions are not indurated and the neighboring glands are very slightly affected. Cancer may be excluded by a histopathological examination, but it is impossible by this means to distinguish between syphilis and tuberculosis.

SACHS.

Disseminated Miliary Tuberculosis of Lung and Skin—W. B. NORTHRUP, Am. Jour. Dis. Child., Jan., 1914.

In 6 cases of infants and young children suspected of disseminated miliary tuberculosis of the lungs, the Röntgen-ray has, with the aid of other tests, decided the diagnosis. The diagnosis was confirmed in 2 cases by necropsy, in one by examination of an excised gland, in one by inoculation into a guinea-pig, and in the others by finding the bacilli in the throat swabs, etc. The eruption in cases of disseminated miliary tuberculosis of the lungs is papulo-vesicular, perhaps more vesicular from the first. In one case the rash on the neck consisted of little vesicles like sudamina, though a little larger. The rash was on all skin surfaces, including soles, palms and scalp, with more about the mouth, anus and buttocks. All cases presented, on entrance to the hospital, a picture of acute pneumonia, and the chart seemed to bear this out. The röntgenogram was really the first means of positive diagnosis, the tubercle bacilli being found subsequently. The physical signs were those of bronchitis. The eruption of miliary tuberculosis is nearly always associated with a fatal form of tuberculosis in the young child.

SACHS.

Small-Pox and Chicken-Pox—H. W. HILL, Jour. Canad. Med. Ass., Feb., 1914.

Some prevalent misconceptions concerning the differential diagnosis of small-pox and chicken-pox are: (1) That chicken-pox occurs only in children. Cases in adults are by no means uncommon. (2) That small-pox does not invade the scalp. This is not absolutely true. (3) It is stated that small-pox alone invades the palms and soles. Chicken-pox not infrequently shows one or more palmar or plantar lesions. (4) It is also stated that small-pox alone presents lesions in the mouth. Almost every case of chicken-pox shows some mouth lesions. (5) It is true that small-pox lesions are umbilicated while chicken-pox lesions are not, if the statement be confined strictly to the vesicles of the two diseases. But if a chicken-pox vesicle be broken off the lesion, a slightly pitted summit of the papular base of the vesicle may be exposed. This pitting may be mistaken for umbilication, and high authorities have erred because they overlooked the predominant characteristics of the predominant type. In small-pox, the severest systemic disturbance and suffering are often found during the prodromes, while in chicken-pox, the practical absence of prodromes means that the first appreciable systemic disturbance begins with the eruption. In small-pox, itching during the early stage of the eruption is usually not marked, while in chicken-pox, itching is highly characteristic. SACHS.

Acute Articular Rheumatism—G. SINGER, Deutsche med. Wochenschr., April 16, 1914.

Acute rheumatic polyarthritis is a form of pyemia, caused by special streptococci probably the streptococcus mitis or viridans discovered by Schottmüller in endocarditis lenta. These microorganisms invade the organism mostly through the tonsillar portal. MILL.

Epidemic Cervical Adenitis—R. D. RUDOLF, Brit. Med. Jour., Jan. 10, 1914.

Epidemic cervical adenitis appears to be a rare disease, but a number of epidemics have been described. Unrecognized epidemics have been thought to be examples of a new type of disease. The patients are suddenly seized with fever, and soon show great enlargement of the lymphatic glands of the neck, without sufficient cause in the throat or elsewhere to account for the condition. The bacteriology of this very infectious disease is unknown, but, in one of two cases occurring in the author's family, streptococci were found in the pus from an abscess of one of the cervical glands. SACHS.

RESPIRATORY AND CIRCULATORY ORGANS

Practical Points in Sphygmomanometry—G. OLIVER, Practitioner (London), Jan., 1914.

The auditory reading of the pressure extends the clinical range of the manometer; for, while practically excluding the personal equation, it not only yields definitely the complete arterial pressure cycle, but also affords useful lines on such aspects of the circulation as the vigor of the ventricles, the degree and duration of the pulse strain on the arterial wall, and the tonus and resiliency of the artery.

SACHS.

Systolic and Diastolic Blood Pressure Estimation—J. A. MACWILLIAM and G. S. MELVIN, Brit. Med. Jour., Mar. 28, 1914.

The chief advantage of the auditory method is that the sense of hearing is substituted for the somewhat more fallible tactile sense. The simplicity, ease, and rapidity of this method are points in its favor. It is greatly superior to the palpatory and sphygmographic methods that have been proposed. All the evidence as to diastolic pressure gained by the other methods, and much more also, can be better obtained by the quick and simple auditory method. The diastolic estimation in this way is as easy as that of systolic pressure, and is relatively little, if at all, complicated by certain sources of fallacy (for example, state of arterial wall) which may come into question in systolic estimation.

SACHS.

Hereditary Syphilis and Aortic Changes—H. NEUGEBAUER, Wiener klin. Wochenschr., April 23, 1914.

Hereditary alterations of the aorta and its valves, together with a positive Wassermann reaction, may be the only symptoms of a syphilitic condition. These changes do not a priori shorten the life of the patient; they only develop under unfavorable conditions so that in the course of time they may call forth clinically-manifest disturbances. Hereditary syphilitic aortitis, like acquired syphilitic aortitis, may give rise to valvular insufficiency or to the formation of an aneurysm.

MILL.

The Blood-Flow in the Hands in Diseases of the Heart—G. N. STEWART, Arch. Int. Med., Jan. 15, 1914.

The hand flow is more apt to be markedly deficient in cases in which there is disease of the myocardium. Even when there is considerable venous engorgement in cardiac cases, the flow in the hands may be little, if at all diminished provided that the myocardium is not impaired. When in a cardiac case with broken compensation, the hand flow is normal, or not much diminished, the indication is that the myocardium has not as yet suffered serious impairment.

SACHS.

Diagnostic and Prognostic Import of Pulsus Alternans—O. ROTH, *Deutsches Archiv f. klin. Medizin*, Vol. CXIV, Nos. 1 and 2.

Description of 2 cases. In the first case pulsus alternans could be evoked by exercise, injection of atropin and amyl nitrite. The second case demonstrated that pulsus alternans, when there are no symptoms of collapse in spite of high pulse-frequency, does not necessarily imply an unfavorable prognosis. WESTERN.

Gallop-Rhythm and Extrasystoles in Diphtheritic Myocarditis—W. BLACHER, *Jahrbuch f. Kinderheilkunde*, Vol. LXXIX, No. 2.

Gallop-rhythm and extrasystoles supervene in diphtheritic myocarditis with the onset of the excitation of cardiac activity and the increase of resistance in the systemic circulation. Though the occurrence of gallop-rhythm is no direct indication of the degree of the anatomical lesion, there still exists some causative relation inasmuch as the heart muscle, damaged by the diphtheria poison, reacts very readily to nervous, mechanical and other influences. MILL.

Excretion of Sodium Chlorid in Cardiopaths—BARANTSCHIK, *Deutsches Archiv f. klin. Medizin*, Vol. CXIV, Nos. 1 and 2.

Sodium chlorid, introduced with the diet in the amount of 15 grams daily, appears, as a rule, more slowly in the urine of cardiopaths, even when there is complete compensation, than in individuals with normal circulation. WESTERN.

ALIMENTARY TRACT

Diagnosis of Salivary Calculi—O. HEINEMANN, *Münchener med. Wochenschr.*, April 21, 1914.

Salivary calculi are easily recognized as a general rule. They occur mostly in Wharton's duct and in the submaxillaris. The diagnosis is least difficult when the concretion totally occludes the mouth of the duct. In this case there ensues a painful swelling of the salivary gland, the so-called inflammatory salivary gland tumor of Bruns. In some cases the point of the odontolith, which is usually of a small size, penetrates from Wharton's duct in the caruncula sublingualis. In other instances the stone may be felt as a hard mass in the course of the terminal duct. If a fine sound is then introduced the characteristic feeling as if metal strikes stone is communicated to the examiner's fingers, exactly in the same manner as when a vesical calculus is being struck by the urinary sound. However, if the odontolith is situated in the beginning of the duct or in the salivary gland itself, a diagnosis cannot be made without the sound unless the X-ray is resorted to.

Author recommends very thin sounds; the instruments for sounding generally made use of are much too thick. The best sounds are the most slender eye-sounds employed in the exploration of the lacrymal ducts. In certain cases the duct terminals must be slit before these fine sounds are being introduced. MILL.

Syphilitic Paralysis of the Esophagus—R. SAUNDBY, Brit. Med. Jour., Jan. 31, 1914.

Paralysis of the esophagus may be caused by diphtheria, or by hemorrhage, softening, tumor, or sclerosis of the brain, and by pressure from enlarged lymphatic glands on the vagus nerve, or by disease of the vertebræ, chronic alcoholism, or lead-poisoning setting up neuritis. To these etiological agents author adds syphilis. In his case, the esophageal paralysis occurred as one of a series of syphilitic phenomena which yielded rapidly to specific treatment. SACHS.

Hour-Glass Stomach—C. T. HOLLAND, Liverpool Medico-Chirurgical Jour., Jan., 1914.

Though an X-ray examination in cases of hour-glass contraction of the stomach is diagnostic as to the presence of the constriction, whilst it can show with remarkable accuracy the size and the shape of the two sacs, the rate at which food can pass from the upper to the lower sac, the presence of an old ulcer cavity, very frequently the presence or absence of pyloric obstruction,—there are certain things which it cannot always do, and one of these is that it is not possible to definitely exclude the possibility of malignant disease. SACHS.

New Diagnostic Sign in Injuries of Abdominal Viscera—E. B. CLAYBROOK, Surg. Gynecol. and Obstet., Jan., 1914.

Author first called attention to this sign in 1904. It consists in the transmission of the heart and respiratory sounds, so that they can be heard all over the abdomen almost as well as over the chest. After 9 years of investigation of all cases coming under his care, in which there was the slightest chance of an internal injury, author concludes that the sign is, when present, a positive indication for immediate laparotomy, whether the other signs present indicate grave trouble or not. The sign has been observed as soon as $\frac{1}{2}$ hour after the injury has been received, and it may continue in unoperated cases for 24 hours, or it may even last for days. It has not been observed in injuries of the abdominal wall, without internal injury, or in cases of extraperitoneal rupture of the bladder. The sign was present in cases of ruptured mesentery with hemorrhage, ruptured spleen, ruptured bowel, ruptured liver, ruptured tubal pregnancy, and immediately after the rupture of an appendix. It

is not present in post-operative cases. The sign is not found if the effusion develops slowly, as in peritonitis or ascites. Author believes that the sign is due to irritation of the parietal peritoneum by the sudden outpouring of foreign material, as bowel content, blood and urine, into the abdominal cavity. SACHS.

Clinical Points in the Diagnosis of Abdominal Disease—R. J. M. BUCHANAN, *Liverpool Medico-Chirurgical Jour.*, Jan., 1914.

Pain referred to the abdomen is not uncommon in empyema, and even after the resection of rib, it may become chronic. Attacks of colicky pain may be due to arteriosclerosis. Spasm of the abdominal recti muscles may be at times so prominent as to simulate malignant growth. Peristalsis of the stomach or gut may at times produce local distensions, which under the hand may feel like a solid growth, but which fades and recurs from time to time. It often occurs and is almost permanently localized at the proximal side of an obstruction, and is of value as a diagnostic sign of the latter. The occurrence of nodules in the skin and subcutaneous tissues is an important diagnostic sign of visceral malignant disease. The so-called "globus hystericus" is not uncommonly a true symptom of gastric and duodenal ulcer. It is due to spasm of the pharyngeal muscles and upper esophagus. Loss of appetite is an important and primary symptom in gastric carcinoma, whereas in gastric ulcer it is inconsistent and capricious. In septic infections of the peritoneum, the abdominal wall has a peculiar boggy feeling. Edema may occur, and this is a pathognomonic sign. Phlebitis in the middle aged is sometimes the earliest symptom of malignant growth. Disseminated peritoneal growths of doubtful origin may be traced to a primary focus in the testes. SACHS.

Triple Syndrome in Abdominal Emergencies—R. MORISON, *Brit. Med. Jour.*, Jan. 3, 1914.

Surgical skill has little to do with the fate of a patient who is the victim of an abdominal emergency. A prompt diagnosis is the most important factor in recovery. A stage of shock, a stage of reaction, and a stage peculiar to each lesion should occur in all abdominal emergencies. Author draws special attention to the stage of shock. In the first stage of all the dangerous lesions, pain is severe enough to produce symptoms of shock, varying from a feeling that something serious has happened, accompanied by pallor, sweating, and feebleness, to such a bad sensation and symptoms, as to threaten death. This stage, which may last but a few minutes to half an hour, is followed by the stage of reaction, and in this phase of the emergency the patient may be apparently so well as to deceive the most astute observer. The most important symptoms and signs in this phase are tenderness and rigidity of

the abdominal muscles on palpation, and shifting dulness and percussion.

SACHS.

Desmoid Tumors of the Abdominal Wall—F. JEANS, *Liverpool Medical-Chirurgical Jour.*, Jan., 1914.

The importance of this class of tumors consists in recognizing the fact that they may be malignant, and therefore as wide a removal as is possible should be carried out.

SACHS.

Peristalsis of the Large Intestine—A. C. JORDAN, *Arch. Röntgen Ray* (London), Feb., 1914.

Peristalsis of the large intestine is observed immediately after a bismuth enema, or better still, after introducing fluid into the cecum through a fecal fistula, or the aperture of an appendicostomy; in cases of diarrhea, whether accidental or habitual; in patients who have been taking liquid paraffin; and as a normal phenomenon. A study of this type of cases shows that the mechanism is fundamentally the same in all, the main difference being in the rate of progress. The more liquid the contents, the more rapidly are they carried on by a contraction wave, and the greater the distance through which they are carried by each wave. With an enema, or in diarrhea, the rate of passage through the large intestine during a peristaltic wave is 4 minutes for the complete transit—cecum to rectum; even one or two minutes may suffice. The rate of progress is much slower in the normal cases; 2 minutes from the splenic flexure to the rectum. The complete passage from the cecum to the rectum in one movement is only seen in cases of diarrhea, or with fluid injections.

SACHS.

Early Diagnosis of Ruptured Intestine—V. Z. COPE, *Lancet*, Jan. 17, 1914.

Providing that there is no lesion in the chest and that renal trauma is excluded, it is advisable to open the abdomen on the suspicion of ruptured intestine if the following conditions be present: (1) When severe abdominal pain persists for more than about 6 hours after an injury, if the pain be accompanied by either (a) vomiting, especially bilious vomiting; or (b) a pulse gradually rising from the normal; or (c) persistent local rigidity tending to extend; or (d) deep local tenderness with shallow respiration; and (2) when abdominal pain is absent or only slight, but the pulse rises steadily hour by hour and the patient is very restless or listless.

SACHS.

Pericolic Membranous Films and Bands—L. S. PILCHER, *Annals Surg.*, Jan., 1914.

Author is of the opinion that enough clinical observation has now been accumulated to confirm and emphasize the statement that right-sided pericolic membraniform veils and bands, crippling the peristaltic function of the cecum and ascending colon, are of frequent

occurrence, and that when present, they, in many cases have been the cause, and may in the future be a cause of much ill-health and suffering. Therefore, in any operation involving the right side of the abdomen, Pilcher advises that the incision be so planned as to make it possible to explore for their presence and do whatever is necessary for their removal.

SACHS.

Leukocyte Count in Appendicitis—G. F. ALDOUS, Brit. Med. Jour., Jan. 31, 1914.

A leukocyte count is of paramount importance in elucidating vague symptoms referable to the appendix region. If cases with masked constitutional symptoms, and with a temperature and pulse below 100, have a leukocyte count between 15,000 and 30,000, the appendix is usually semi-gangrenous, with an intact serous coat, and a lumen, distended and filled with foul pus.

SACHS.

Alimentary Galactosuria in Hepatic Diseases—J. HATIEGAN, Wiener klin. Wochenschr., April 2, 1914.

Observations on 41 cases have shown that alimentary galactosuria is almost a constant phenomenon in catarrhal icterus. The large amounts of galactose excreted differentiate this type of icterus from other affections of the liver associated with icterus.

MILL.

Testing of Liver Function by Means of Levulose—T. ARAL, Deutsche med. Wochenschr., April 16, 1914.

Small quantities of levulose (50 grams, occasionally only 30 grams) suffice for testing the function of the liver. The levulose is ingested on the empty stomach. In healthy individuals a positive result is hardly ever obtained with it. The urine, after the ingestion of the levulose, is best examined by Nylander's reagent. Prior to the examination of the levulose-urine the urine of the fasting period should be tested for a sugar reaction. Marked tolerance-decrease for levulose was found in hepatic cirrhosis, pronounced syphilis of the liver and other atrophic processes of this organ. The tolerance for levulose, on the other hand, had not been changed in the presence of tumors or parasites of the liver, gall-stones and leukemia.

MILL.

Frequency of Gall-Stones—E. HESSE and M. HESSE, Beiträge z. klin. Chirurgie, Vol. IXC, Nos. 2 and 3.

Autopsies on 17,402 cases showed the presence of gall-stones in 378 instances, i.e. 2.17 per cent. In men as well as in women the greatest frequency of gall-stones is in the sixth decennary of life. In 84 per cent. of the cases the gall-stones were latent. In the etiology of cancer of the gall-bladder cholelithiasis plays a certain part. Cholecystitis without concretion is not as rare a condition as was assumed in past years.

MILL.

NERVOUS SYSTEM

Injuries of the Back—A. S. MORLEY, Practitioner (London), Feb., 1914.

The spinal cord terminates at the level of the first lumbar vertebra, and therefore it is at least improbable that blows or strains of the back below this level can affect it, a fact which it is well for doctors to bear in mind when on the witness stand. The ligaments of the vertebræ are very numerous and any of them may be injured. The intervertebral discs may be torn and give rise to one of the forms of incomplete fracture of the spine. The lamina of the vertebræ are held together by the powerful ligamenta subflava which are concerned by reason of their elasticity in the resumption of the erect posture after stooping. Thus a man who walks with his back bent almost double is unlikely to be the subject of such an injury because he would then put the ligament on the stretch and so cause himself pain. Synovitis of the articular processes is not uncommon, and as these joints are mainly concerned in the movements of rotation and lateral flexion of the spine, these movements will be chiefly restricted if synovitis be present. When the erector spinæ muscles are affected, the patient adopts a bent attitude and resents any request to straighten his back. If a patient is alleged to be suffering from a muscular strain of the back, and yet asserts that he cannot stoop, one may feel confident that it is not one of the muscles of the back which is at fault, and that the diagnosis is incorrect. If extension of the spine is impossible or painful, and lateral movement to the right is painless, while lateral movement to the left is painful, the affected muscle is one of the erector group on the left side of the spine.

SACHS.

Diagnosis of Affections of the Spinal Column—A. SCHANZ, Zentralblatt f. Chirurgie, 1914, No. 8.

Author advances a new sign that evinces the existence of serious disease of the spinal column. The sign, which cannot be simulated, consists in the convulsive contraction of the long muscles in the lumbar region. This contraction is not only noted in purely traumatic, but also in inflammatory affections of the spinal column.

MILL.

Gait in Nervous Disease—D. W. C. JONES, Practitioner (London), Jan., 1914.

The tabetic depends entirely on his sight for his equilibrium, wastes force by throwing the limbs too high and bringing them violently onto the ground, and assists balance by walking on an abnormally wide base. A patient with cerebellar disease cannot control the harmonious action of opposing groups of muscles, although quite conscious of his position; he therefore adopts a wide

in the early stage by hematuria alone, and in all three cases the attacks of bleeding were at first of short duration, small in amount, and at considerable intervals; at a later date they lasted longer, and were frequent and copious. The first case is rather an exceptional one in that the tumor was attached to the anterior wall of the bladder. Benign papillomata of the bladder, in a certain number of cases, recur after removal. The amount of bleeding and the frequency of the attacks have no relationship to the character and size of the tumor; the situation is more important, and it is certain that a tumor situated near the neck of the bladder will bleed more freely than a growth arising elsewhere.

SACHS.

Retrovesical Echinococcus Cyst—J. B. SQUIRE, *Annals Surg.*, March, 1914.

Author reports a case which was sent to him with the diagnosis of large vesical calculus. The X-ray plate showed that there had been a misinterpretation of the findings, the mass that was seen on the plate being extravescical. The patient complained of frequent urination and pain in the glans penis. The abdomen was distended by a tumor occupying the hypogastrium. Percussion and palpation showed that the bladder was enormously distended. Six ounces of urine were obtained by catheterization, the fluid being clear. The bladder was opened through a supra-pubic incision and a large number of echinococcal daughter cysts found. The hypogastric mass disappeared and a few days later the patient was operated on for what was diagnosed as a cyst of the kidney, because of the demonstration of another mass in the right epigastric region. It was found that the mass was located in the liver. A third mass was found and operation showed that it was in the omentum which was adherent to the peritoneal covering of the bladder. At this operation the bladder was further opened and an opening found in the trigone, about the size of a half-dollar. Perineal incision demonstrated this to be the mother cyst which had opened into the bladder. Appropriate treatment was followed by recovery.

KAUFMAN.

Bimanual Examination of the Prostate—H. F. O. HABERLAND, *Zentralblatt f. Chirurgie*, 1914, No. 16.

Bimanual examination of the prostate gland is the most simple method to gain a stereognostic clear conception about its general condition. The examination is conducted as follows: The patient lies in the dorsal position, draws up his legs and breathes with open mouth. After the bladder has been emptied the index finger is inserted into the rectum and the posterior wall of the symphysis is palpated while four fingers of the other hand push the empty bladder toward the index finger in the rectum. This bimanual examination gives a clear conception concerning the size, form and con-

sistency of the prostate and seminal vesicles, and gives even good results when the abdominal walls are unusually thick. MILL.

Prognosis of Sarcoma of the Testicle—E. A. CODMAN and R. F. SHELDON, Bost. Med. and Surg. Jour., Feb. 19, 1914.

The prognosis of sarcoma of the testicle while bad, is not when operated on so universally bad as text-books would lead one to infer. Of 56 cases operated on, 13 are living after an average time of 9 years after operation (extremes 2 and 28 years), and 10 have died from something else. Of the 33 operated cases which died from the disease, 21 had no sign of metastasis at operation, yet death occurred in all within 3 years. SACHS.

FEMALE ORGANS OF GENERATION—PREGNANCY— PARTURITION—INFANTS

Observations on Pelvimetry—D. DOUGAL, Jour. Obstet. and Gynecol. of Brit. Emp., Nov., 1913.

If the external conjugate measures 7.0 inches or less, the pelvis is probably contracted, and almost certainly so if the same diameter measures less than 6.75 inches. There is no accurate method of estimating the length of the true conjugate from that of the external conjugate; the margin of error in Baudelocqu's calculation being so great as to render it useless, not to say dangerous, in practice. The author concludes with Van der Hoeve that the indirect method of measuring the true conjugate is open to grave errors, but he is of the opinion that, as it is the only method capable of general application, when used with a full knowledge of its limitations, it gives sufficiently accurate results in the great majority of cases. SACHS.

Blood of Mother during Labor and Lying-in Period—W. SIEBEN, Beiträge z. Geburtshilfe u. Gynäkologie, Vol. XIX, No. 2.

During the puerperal state there is noted pronounced destruction and active regeneration of red cells in the mother's blood. There also ensues an increase in the number of leukocytes; this puerperal leukocytosis does not terminate until the second week. The neutrophile polynuclear leukocytes steadily decline in number; this decrease starts at the time of labor and continues to the end of the lying-in period. The lymphocytes generally exhibit a behavior similar to that of the neutrophile polynuclear leukocytes; the mononuclear, mast and transitional cells are generally absent immediately after delivery, and appear during the puerperium in small numbers only. MILL.

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Special Articles

THE DIAGNOSIS OF ABNORMALITIES OF MYOCARDIAL FUNCTION

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I

THE RECENT DEVELOPMENTS IN THE ANATOMY AND PHYSIOLOGY OF
THE HEART. THE NORMAL POLYGRAM. THE NORMAL
ELECTROCARDIOGRAM.

The diagnosis of cardiac abnormalities requires a knowledge of three elements: (1) Etiological, (2) Anatomical and (3) Functional. In the past while all these features have been considered, the greater stress has been laid on the anatomical diagnosis, etiology has taken a somewhat less conspicuous place and function has perhaps received the least attention. Again until recent years attention has been most closely directed to the anatomical abnormalities of the valves, the endocardium and the pericardium, while the myocardium has received relatively little clinical study.

The explanation of such a development is perfectly simple; our methods of examining the heart mainly by the employment of physical signs were such as to lend themselves particularly to the elucidation of the conditions of the endocardium and the pericardium.

Reasoning from our physical signs we were fairly sure to correctly interpret the kind and extent of the damage to the valves and the pericardium; beyond determining the presence or absence of hypertrophy and dilatation our anatomical diagnosis of the condition of the myocardium was little more than a shrewd guess.

The methods of cardiac examination which have been so rapidly developed in the past decade have afforded us the means of studying the heart from an entirely new standpoint.

The polygraph and the electrocardiograph have put us in the way of studying many cardiac conditions which had hitherto been unrecognized. These instruments afford us records of the functional activities of the heart; in the main they are records of myocardial function. Such studies often permit us to draw inferences in regard to the anatomical condition of the heart muscle. They have already helped us materially in formulating our prognosis. Such records are extremely valuable in that they register graphically the functional condition and can be preserved for future reference and comparison with later observations, unclouded by the haze with which time is so apt to obscure the evidence obtained by the eye, ear and finger, even though these are reinforced by carefully written notes.

Perhaps the most important contribution which these later methods have made to the average clinician is that they have made his powers of observation more acute; they have given new meaning to the old physical signs and, with a knowledge of what the polygram and the electrocardiogram have disclosed, he is able to detect and interpret physical signs which hitherto went unrecognized or were without meaning.

Every patient with abnormal cardiac function cannot be brought within the sphere of the electrical attachments of an electrocardiograph. The electrocardiograph is an expensive laboratory instrument suited to the facilities of the large hospitals or the office of the consultant and cannot be included in the armamentarium of the average general practitioner. Even the polygraph, although portable and not particularly expensive either in its first cost or upkeep, is an instrument which requires a certain amount of training and a very large expenditure of time for its successful operation.

It is therefore comforting to know that if one sufficiently familiarizes himself with the kind of evidence which these instruments

afford, and the nature of the cardiac abnormalities upon which they throw light, he should by carefully cultivating his powers of observation be able to detect on physical examination the signs which in 90 per cent. of all cases will allow him to make as correct a diagnosis and apply as well a directed course of treatment as he could if his observations were reinforced by the most elaborate records.

ANATOMY

In order to elucidate our conception of the functional activities of the myocardium it will be well for us to briefly review a few anatomical facts.

The embryonic heart of the vertebrates first appears as a tube, at the posterior portion of which the veins coalesce to form a cavity which is known as the sinus venosus. In the course of development the tube is bent upon itself and from its wall a series of chambers are formed which ultimately become the auricles and ventricles. These features are more clearly seen in some of the lower vertebrates. In the higher vertebrates the separation of these chambers becomes less distinct; the sinus venosus disappears as a distinct structure and is fused with the tissues of the superior and inferior cavae and that portion of the right auricle which lies between the termination of these veins.

Recent histological studies have afforded facts of peculiar interest and lend support to the theory of myocardial function, which is today pretty generally accepted. The study of serial sections of the mammalian heart has served to demonstrate certain structures which up to this time had been unrecognized. Keith and Flack have described a collection of muscle cells of such structure as to distinguish them from the surrounding tissue lying near the junction of the superior cava with the right auricle and extending along the sulcus terminals for a distance of about 2 c.m. (in man). These cells are fusiform, striated, have elongated nuclei and are embedded in dense connective tissue; they have a special arterial supply and intermingled with them are some nerve cells and nerve fibers which connect with the vagal and sympathetic nerve trunks. This specialized tissue is known as the *sino-auricular node* and is believed by Keith and Flack to be a remnant of the original sinus tissue. Similar isolated masses, which are believed to be remnants of the primi-

tive canal as it passed through the auricle, have been found near the coronary sinus, in the auricular septum, in the valve of Eustachius and at the mouths of the pulmonary veins.

A differentiated mass of tissue similar in structure to the sino-auricular node and known as the *auriculo-ventricular node*, was first described by Tawara. It is situated low down in the auricular tissue at the right posterior edge of the septum; at the anterior end of the auriculo-ventricular node these specialized muscle cells become more parallel in arrangement and form a narrow band ensheathed in a fibrous canal. This structure is known as the *bundle of His*. It runs forward and to the left in the central fibrous portion of the heart to the membranous septum of the ventricles; at a point a little in front of the anterior end of the attachment of the median segment of the tricuspid valve the bundle divides into two branches; the left branch immediately passes through the membranous septum and is continued downward along the septum beneath the endocardium of the left ventricle; branches are given off all through its course in the septum; the principal branches going to the papillary muscles of the mitral valve; the right branch of the bundle is directed downward beneath the endocardium of the right ventricle to the papillary muscles where subdivisions begin to be given off from the main trunk.

The subdivisions of the conducting system are continued into that complex network lying beneath the endocardium of both ventricles known as *Purkinje's fibers* and these in turn make direct connection with the muscle fibers of the ventricles.

PHYSIOLOGY

Recent investigations strongly support the hypothesis that the rhythmic activity of the heart is dependent upon certain properties of the muscle cells. This is known as the "*Myogenic Theory*," and is to-day generally accepted in place of the "*Neurogenic Theory*," which assumed that the rhythm of the heart was dependent on a nerve center.

The myogenic theory is of the highest importance in analyzing and explaining the mechanism of the activity of the heart and affords us a practical working hypothesis of great value in the diagnosis of myocardial conditions.

The muscle cells of the wall of the heart have been found to possess five properties, which, while interdependent to a certain extent are sufficiently distinct to permit of separate study and description. These five properties are:

1. *Stimulus production* or the property of the formation of stimuli.
2. *Excitability* or that property by virtue of which the cell is capable of responding to stimuli.
3. *Conductivity* or the property by virtue of which stimuli are transmitted from one muscle cell to another.
4. *Contractility* or that property which produces a shortening of the muscle cell.
5. *Tonicity* or that property through which the cell, when not contracting, maintains a position somewhat short of complete relaxation.

In order to intelligently interpret the myocardial activities several other features should be held prominently in mind. The law of "*All or None*" or of "*Maximal Contractions*" was discovered by Bowditch in 1871. He showed that if a stimulus was strong enough to induce a contraction, the cardiac muscle responded to that stimulus with all the contractile power of which it was capable at that particular moment; also that the size of the contraction was independent of the strength of the exciting stimulus; a small stimulus, if effective, produced a contraction just as large as a stronger stimulus. When the heart muscle was stimulated it responded with a maximal contraction or none at all.

That the cardiac muscle cells possess a "*Refractory Period*" was discovered by Marey in 1875. He was able to show that there was a period beginning just before systole and continuing a short time after it during which the heart will not respond to stimuli even if these are of great strength. The studies of Engelmann have demonstrated that during the refractory period the properties of excitability, conduction and contractility are all abolished. After systole excitability is gradually restored so that, whereas immediately after the refractory period the heart will respond only to stimuli of great strength, as diastole advances the minimal stimulus necessary to produce a contraction becomes progressively smaller. Engelmann showed in like manner that the conductivity and contractility grad-

ually increased with the lengthening of the time between the end of the refractory period and the time when the stimulus was applied.

When we come to study the functions of the primitive cardiac tube in the lower vertebrates (as for example the frog, in which portions of the primitive tube still exist, as the sinus venosus, auricular canal and the aortic bulb), we find that all of its parts possess in a high degree the power of originating stimuli, but the posterior portion of the tube as represented by the sinus venosus is even more excitable than the other parts of the tube, hence normally the cardiac contractions start from the sinus.

The capability of parts of the frog's heart, other than the sinus, to originate stimuli resulting in contraction, is demonstrated by the Stannius experiment. When a ligature is so applied as to separate the sinus venosus from the auricle, the sinus will continue to contract rhythmically, but the rest of the heart ceases to move; after a time, however, the auricle and ventricle again begin to beat, but at a rate slower than that of the sinus and quite independent of the sinus rhythm. If now a second ligature be applied between the auricle and the ventricle, the auricle will continue to beat and after a short pause the ventricle will begin to contract rhythmically at a rate slower than that of the auricle and independent both of the sinus and of the auricle.

There are several phenomena presented in this experiment which particularly attract our attention.

- I. The capacity of each chamber to initiate rhythmic contractions independent of the other parts of the heart.
- II. The rate of the spontaneous rhythmic contractions is fastest for the sinus, intermediate for the auricle, slowest for the ventricle.
- III. In the intact heart before such ligatures are applied the rate of the rhythmic contractions of the whole organ is determined by the rate of the sinus, i.e. by the portion which has the fastest rate, or, in other words, that which has the greatest excitability. In a similar manner when the sinus is cut off the auricle sets the pace for the ventricle.

As was pointed out in the preceding section on the histology of the mammalian heart certain special structures have been found in

different portions of the heart which have many features in common. These were the "*Sinus Node*," the "*Auriculo-ventricular Node*" and the "*Bundle of His*." A study of the functions of these structures leads us to believe that they are remnants of the primitive cardiac tube and retain the qualities of the original tube in a higher degree than other portions of the cardiac musculature.

Anatomical, morphological and developmental evidence indicate that the "*Sinus Node*" is the normal *pace maker* of the mammalian heart. This evidence has been reinforced by considerable experimental work, a brief digest of which may be found in Thomas Lewis' valuable work, "The Mechanism of the Heart Beat," Chapter IV.

There is certain evidence that under pathological conditions the "*Auriculo-Ventricular Node*" may become the pace maker of the heart, giving rise to a form of heart activity that is known as "*Nodal Rhythm*."

In other pathological conditions when the conducting path from the auricle to the ventricle is severed (termed auriculo-ventricular block), the evidence is in favor of the assumption that the main trunk or one of the branches of the "*Bundle of His*" originates the stimuli which set the pace for the ideo-ventricular rhythm which is then established.

GRAPHIC AIDS TO DIAGNOSIS

Two of the aids which have of late been extensively utilized to interpret myocardial function are the *polygram* and the *electrocardiogram*. The *polygram* is a graphic, synchronous record of two or more parts of the circulatory system, usually of the radial and jugular pulses. The main facts of clinical importance which have been obtained from polygraphic studies of the circulation have been derived from a comparison of the relations of the auricular and ventricular activities. The value of records of the apex beat, carotid, brachial and radial arteries, depends on the fact that they represent more or less accurately the activities of the left ventricle, while the movements of the jugular veins or pulsating liver give us a certain insight into the activities of the right auricle.

In clinical work we usually make use of synchronous records of

the radial and jugular tracings. (Fig. 1.) The principal waves of the jugular tracings are, the wave of auricular systole (a); the wave synchronous with, and probably due to carotid pulsation (c); the (v) wave, due to rising auricular pressure during the ventricular systole; the depression (x) is mainly due to the relaxation of the auricle after its systole; the depression (y) is due to emptying of

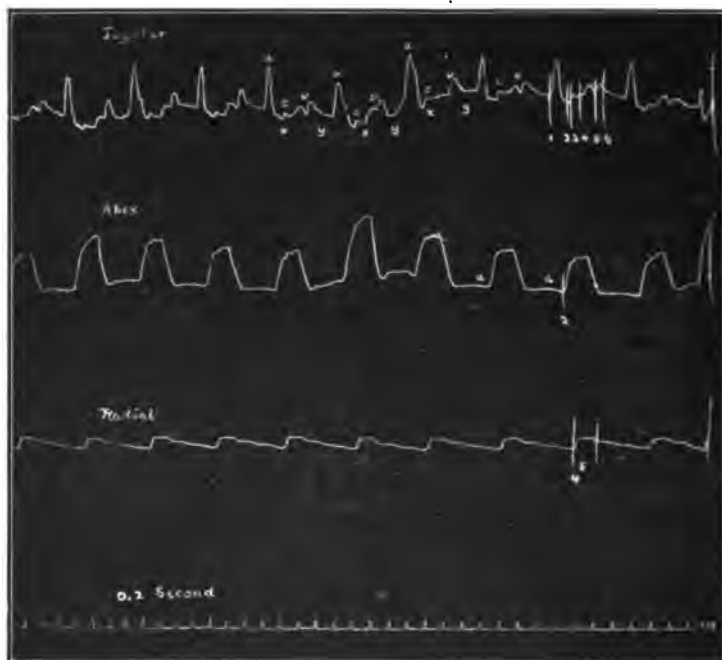


FIG. 1. NORMAL POLYGRAM

1, beginning of auricular contraction; 2, beginning of apex beat; 3, beginning of carotid wave; 4, beginning of radial wave; 5, closure of semi-lunar valves; 6, opening of tricuspid valve; $E=3-5$ =ventricular systolic period.

the auricle after the opening of the tricuspid valve; the closure of the semi-lunar valve is frequently marked by a notch in the ascending limb of the (v) wave. The opening of the tricuspid valve is indicated by the termination of the (v) wave.

The first step necessary in analyzing the jugular tracing is to locate the (c) wave. To accomplish this one measures accurately with dividers the distance of the foot point of any given radial

wave from the line marking the beginning of the radial tracing. One then measures off the corresponding distance from the starting place of the jugular tracing; at the distance equivalent to 0.1 second preceding this point will be found the (c) wave, since the pulse wave requires 0.1 second to travel from the carotid to the radial at the wrist. In the normal tracing the (a) wave will be found preceding the (c) wave by 0.2 second. The (v) wave follows the (c) wave, separated from it by the depression (x). The depression (y) follows the (v) wave.

In various arrhythmic conditions of the heart there will be found variations in the relations of these waves of the jugular pulse. These variations afford us the means of determining the time relations of the auricular and ventricular activities, and from these can be deduced certain abnormalities in the fundamental properties of the cardiac tissues.

The *electrocardiogram* is a graphic record of the variations of the electrical potential of the heart. It is obtained by photographing on a moving film the movements of the indicator of a delicate galvanometer, arranged to respond to the electric currents which develop in the heart during its activity.

When no current is passing through the string of the galvanometer the electrocardiogram represents a base line which shows the string at rest. When the current passes through the string it is deflected and these deflections are shown in the electrocardiogram as waves varying in height and length. The principal features of the lettering of the waves of the normal electrocardiogram, as first suggested by Einthoven, are shown in Figs. 2, 3, 4. The wave (P.) corresponds to the systole of the auricles; the waves (Q, R, S, T,) correspond to the systole of the ventricles; of these waves (R) and (T) are most constant and are best understood. (Q) and (S) may either one or both be absent in the electrocardiogram of the healthy subject. A satisfactory interpretation of all of the elements of the electrocardiogram is not yet possible, but the following summary indicates the significance of the main features as most generally accepted at the present time:

(P) = the auricular systole.

(P to R) = the time occupied in the conduction of the impulse from the auricle to the ventricle, normally 0.12 to 0.17 seconds.

THE ARCHIVES OF DIAGNOSIS
NORMAL ELECTROCARDIOGRAM

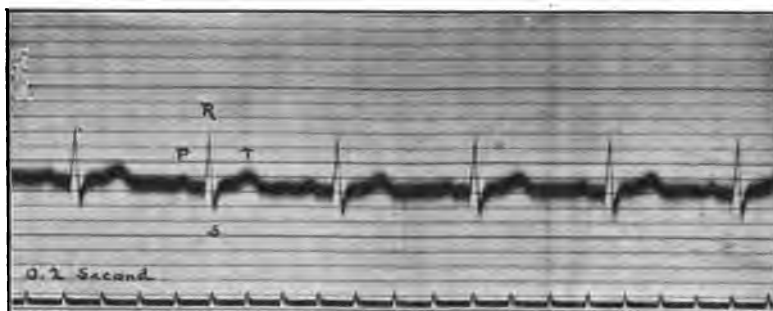


FIG. 2
Lead I (right arm—left arm)

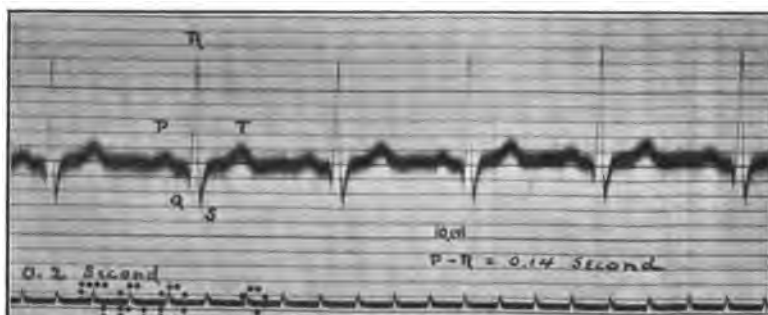


FIG. 3
Lead II (right arm—left leg)

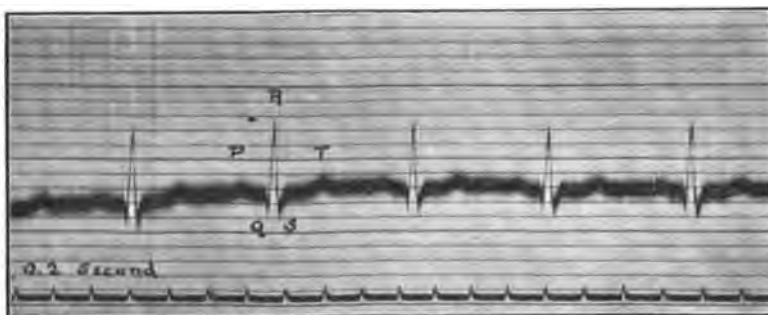


FIG. 4
Lead III (left arm—left leg)

- (Q) = the first evidence of ventricular activity; probably portions of the ventricular muscles at some distance from the base.
(R) = the activity of the basal portion of the ventricle.
(S) = the activity of the apical portion of the ventricle.
(T) = the final activity of the ventricle, probably the basal portion near the exit to the great arteries.
(T) to the following (P) = the diastolic period.

The character of the electrocardiographic curve varies with the parts of the body from which it is derived. In routine work it is customary to take three records from each patient designated as follows:

LEAD I

Current from right arm and left arm.

LEAD II

Current from right arm and left leg.

LEAD III

Current from left arm and left leg.

Electrocardiograms obtained from a normal individual by the three leads as described, present different features. The wave (P) is positive in *all leads*. (P) to (R) interval varies slightly in the *three leads*. All the waves of *lead II* are greater than those of *leads I* and *III*. The wave (R) is positive in *all leads*. (T) is usually positive in *all leads*, but is occasionally negative in *lead III*. Even in normal individuals there is a considerable range of variation in the electrocardiogram which lies within the limits of the normal. Among these physiological variations may be mentioned a shortening of the diastolic period in increased frequency of the heart, and variation in the aptitude of the (R) wave synchronous with respiration; the increase in the size of the (T) wave with increased exertion; the changes in (Q) and (S) coincident with the changes of the position of the heart in the thoracic cavity.

In comparing the value of the polygram and the electrocardiogram as means of interpreting the changes in anatomical and functional conditions of the heart we should observe first of all that these two methods record different sets of phenomena. The polygram is a graphic time pressure curve. The electrocardiogram is a

graphic portrayal of the variation of electrical potential during muscular activity. By both of these methods we can study the functions of stimulus production, irritability, conductivity and contractility, but each method has certain advantages and is successful in points where the other is inadequate. They do not portray the same phenomena and are therefore supplemental and corroborative rather than identical. For this reason we have adopted a scheme for taking combined records, i.e., we often record on the same film figures of the electrocardiographic and time pressure curves of the arterial and venous pulses. Conclusions drawn from both types of records are remarkably in accord, thus strengthening the evidence obtained.

NOTES ON SOME OF THE NEWER METHODS OF DIAGNOSIS IN HEART AFFECTIONS

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There have been many and important advances in cardiology since my first book on the subject was issued in 1905.¹ Last year, when an addendum² was found to be desirable, it embraced a dozen topics that either needed remodelling or had not been dealt with in the earlier work. The newer aspects of diagnosis, however, were not included. This paper will take them up. Sometimes the changes have been kaleidoscopic. At other times new developments have called for a recasting of former methods. Essentially new methods have also required description.

As an example of the former, the sphygmograph, which was abandoned by most clinicians some years ago, because it was found to be negligible in the diagnosis of valvular diseases, has proved itself to be both useful in demonstrating auricular fibrillation and of paramount value in differentiating cardiac arrhythmias by the record it furnishes through ordinary polygraphic tracings. On the other hand, the discovery of auricular fibrillation and flutter have altered our conceptions as to what was recently called the permanently irregular pulse. So, too, the electrocardiograph, thought at first to be likely to

supersede the ordinary polygraph for diagnostic purposes, has been found to be less generally useful. It demonstrates extra-systoles and auricular waves better than any other instrument, and by reason of its automatic action is a standard by which other polygraphic tracings may be interpreted, but it does not furnish records so complete in details as the ordinary polygraph.

Taking up, now, some of the diagnostic criteria, and in an order adapted for physical examinations, I premise by stating that the physician should be thorough in his methods and therefore should have always at hand a chart with blank spaces in which to record the necessary data. There is no other department of medicine in which thoroughness is so important. Spaces should be reserved in the chart for name, age, height, weight, respiration and temperature; also for subjective symptoms, such as palpitation, localized pain, and gastrointestinal data; for physical signs, including the condition of the muscular system, configuration of the bony chest, and its cutaneous surfaces. In a similar way records should be made of the pulse, both in the recumbent and erect positions; the location and character of the impulse; the presence or absence of thrills and their location; the site and character of both organic murmurs referable to any of the four valves, and inorganic murmurs as well; of lung, liver, spleen, and occasionally stomach abnormalities; of blood pressure, systolic and diastolic; of hemoglobin percentage; of cardiac efficiency; and of treatment. If urinalysis has been made, the heart, liver, or any other internal organ mapped out, or if graphic tracings have been made, reference should be made to the same in their appropriate places.

In a complete examination, both positive and negative signs should be noted. To repeat, thoroughness is a necessity. Indeed, a physician is certain to be discredited more or less by his patient if he neglects any important data that a previous examination has secured. The more complete as to such details the preliminary examination, the easier will be the subsequent handling of the case. When all these data have been properly recorded in their appropriate places on the chart, it should be filed away, with all memoranda bearing on it, where it will be readily accessible for reference. Such a chart is shown in Fig. 1. I will take up the more important of the topics which are called for in somewhat the order named.

Name			Address		
Date	Age	Weight	Height	Respiration	Temperature
Palpitation		Head Symptoms		Gastrointestinal Conditions	
Pain: Apex Precordium Liver Elsewhere			Genitourinary Conditions		
Muscles Physical Appearance: Bony Thorax Cutaneous			Other Subjective Symptoms		
Pulse: Recumbent Erect Rhythm			Blood Vessels		Thrill
Organic Murmurs					
Aortic Direct " Regurg.		Pulmonary Direct " Regurg.		Impulse at Apex	
Mitral Direct " Regurg.		Tricuspid Direct " Regurg.			
Inorganic Murmurs.					
Blood Pressure: Systolic Diastolic Pulse			Hemoglobin Percentage		
Liver			Spleen		
Lungs			Stomach		
Urinalysis	Functional Efficiency		Graphic Tracings		Map of Heart

Notes

Treatment

In carrying out this scheme, the entire thorax and the upper part of the abdominal surface should be sufficiently exposed to enable the examiner to map out the heart, liver, spleen, and even stomach perhaps. A record should then be made of their locations, areas, and anomalies. The characters of the thoracic parietes and of the tissues covering them should also be noted, while the physical examination of the lungs should be no less complete than in suspected diseases of these organs. Chronic congestion and enlargement of the liver are common in advanced organic heart disease. The spleen is apt to be swollen, tender, and perhaps the seat of metastatic deposits in malignant endocarditis. A dilated stomach will always cause cardiac embarrassment by upward pressure. If there is any considerable degree of cardiac insufficiency, the lungs and bronchi are sure to be involved, while in heart failure they invariably become engorged. In fact, the immediate cause of death may be and often is pulmonary edema, quite as much as myocardial weakness. Sometimes disease of the heart, at other times pulmonary disease, is the factor determining death at the very end. Cardiac embarrassment may also be due to a deformed thorax from Potts' disease, lateral curvature, or rickets. In all instances of bony deformity of the thoracic walls there is some cardiac embarrassment which increases with advancing years. Finally, the capillary pulse as seen in the skin is one of the signs of aortic regurgitation that is tolerably frequent, while the wreath of dark red venous radicles that crosses the left side of the chest in many kinds of heart disease, especially in men advanced in life, suggests some past or present intrathoracic trouble of an organic nature.

Like Mendel's theory of heredity, which was first published in 1866, but was not accepted as a general law until 1900, after a lapse of thirty-four years, so Sahli's announcement of the discovery of his band in 1885⁸ I am now undertaking to emphasize. For it seems as if thus far his discovery had made no serious impression on medical minds. The band consists of a wreath of dilated reddish colored venous radicles, usually from one to two inches wide, disposed in somewhat vertical and parallel lines, though dendritic in appearance. It forms a semi-circle on the left side of the thorax over the lower ribs, its center corresponding to the nipple, below which it runs at a distance of several inches.

Sahli's band may escape notice unless one examines the skin closely, for sometimes it is narrow, the radicles are minute, or it is imperfectly developed. It is said to have been noticed in thoracic aneurisms and mediastinal tumors, but its significance has not yet been established. Judging from analogy, however, some intrathoracic deposit of a fibroid material has taken place, as in adhesive pericarditis, calling for a collateral circulation. It is of the same nature as the Caput Medusæ seen over the anterior abdominal walls in cirrhosis of the liver. I am venturing to call it *Sahli's band*.

But inspection of the chest will not be complete without palpation of the cardiac apex to determine its location and character. A single glance will suffice to tell whether it is in or out of place, and whether the action is forcible or not, diffuse or circumscribed. In marked fatty changes of the heart, especially in fatty degeneration, there is no impulse, as a rule, and this is an important though negative sign.

There are no more important keys to cardio-vascular activities than the arterial and venous pulses. But they have no positive value in differentiating valvular diseases. Even the importance of the Corrigan pulse, which has been vaunted as one of the most characteristic signs of aortic insufficiency, has been over-estimated.

Some years ago, Thayer⁴ found in the autopsical examination of twenty-eight persons with aortic insufficiency uncomplicated by mitral stenosis, in the Johns Hopkins Hospital, that in fourteen, or fifty per cent., there had been no Corrigan pulse. The value of this symptom as a diagnostic sign appeared to him to lie in its association with other objective signs, which he found to be mainly presystolic murmurs, snapping first sound, presystolic thrill, small pulse, and accentuated second sound.

Having discovered that the sphygmograph, as already stated, does not aid us at all in the differential diagnosis of valvular diseases, it has been discouraging to find also that neither the polygraph nor the electrocardiograph is of any greater help in this respect. It is possible that the phonocardiograph may eventually be an aid, but thus far the tracings it has furnished have been disappointing.

A prominent European cardiologist, now dead, is reported to have told his students that an intermission in heart beats was a sign of heart failure, by which he probably meant cardiac inefficiency. In

a dramatic effort to impress a general truth on receptive minds in an unqualified fashion he was, of course, needlessly alarming; but in our day most of us, even in this country, have had similar experiences with clinical teachers. It is certainly true that intermissions characterize any form of cardiac insufficiency up to absolute heart failure, but we need not therefore infer that an occasional dropping of a beat is an alarming sign. It is suggestive; but intermissions, as well as other forms of arrhythmia, are often temporary incidents that have no special significance. They may be caused by indigestion, ceasing when the bowels have been thoroughly moved. Tobacco is very apt to cause them, but they usually disappear when the use of the weed is suspended. In fact, arrhythmias should not be taken too seriously. A youthful type is common. It comes and goes. Even ordinarily healthy persons are apt to have arrhythmia at some time or other.

Attention has recently been called by Klewitz⁵ to the pulse during sleep. Taking twenty normal persons, he found that while the average rate during waking hours was 74.1, in sleep the average was 59.3, a diminution of twenty per cent. Decrease in rate also occurred when there was absolute rest in bed, even without sleep. In decompensation, i.e., in uncompensated valve diseases, there was less average diminution; in fact, the rate was sometimes higher than in waking hours. Arrhythmias due to organic disease did not cease during sleep, but those having a neurotic base did disappear. These experiences emphasize the importance of having the pulse taken systematically by attendants during sleep, whenever the rate is abnormal.

Foreigners use the x-ray to delineate the heart muscle more than we do, both in hospital practice and at health resorts.⁶ Orthodiagraphy, the name given to the method, is useful for corroborating the results of palpation and percussion, but the apparatus* is very bulky, and a dark room is required, while for all practical purposes the other methods now in vogue are sufficiently accurate.

Abrahams has recommended⁷ auscultation by the stethoscope in mapping out the heart. The bell-shaped extremity of the instrument

*The machine best known is made by Reiniger, Gebhart and Schall, of Erlangen, and is for sale by the Kny-Scheerer Company of New York City.

is first pressed down upon the skin in the interspace, two to three inches outside the presumed precordial area. Then, while the patient says "One, two, three," in an ordinary voice or in a whisper, the extremity is gradually advanced toward the center of the precordial area. The voice sounds, as heard at first, appear to come from the lungs, but when the border of the heart is reached they seem to come from the mouth. The upper border of the heart is delineated in the same way. In young children and thin persons Abrahams has found this method of less value.

Pottenger⁸ has originated a new palpation method. With his fingers he begins to press upon the soft tissues two or more inches from the presumed precordial border, and advances them gradually towards the center of this area. He has found a peculiar sense of resistance when the edge of the organ is reached. The accuracy of this method he has tested by ordinary auscultatory processes, and also by orthodiagraphy.

Patients should always be examined for murmurs in two standard positions, the recumbent first and then the erect. There is a material difference in the sounds as heard in these two positions, and these differences should invariably be noted in the examination chart as guides to the differential diagnosis and for future reference. Murmurs are heard less distinctly in the upright position. Examinations may be desirable in other positions in exceptional instances. The prone position may be utilized with advantage in obscure cases, especially in mitral affections. Sometimes it may be necessary to let the patient lie on one side, right or left, to determine the exact position or character of the murmur present.

According to Pepper,⁹ murmurs are intensified by proximity to an air-containing cavity, such as pneumothorax, lung cavities, tympanites, gastric dilatation; and also to dense tissues, such as lung consolidation.

Reduplication or coupling of heart sounds is common both in health and in disease. When of the first sound it may be taken to mean some disorder of the heart muscle or its nervous supply; or it may be due to external causes, such as pressure from without or displacement. It may be caused by extra-systoles of ventricular origin, perpetual arrhythmia, or heart block due to the ventricular implication. Reduplication of the second sound is referable to altera-

tion in the relative blood pressure between the systemic and pulmonary circulations. Reduplication of both sounds indicates naturally that the arrhythmia is of a higher grade than where only one sound is involved.

Notwithstanding criticism of the term "murmur," it is the best we have or are likely to have for a long time for characterizing abnormal sounds that are either associated with in time, or more or less replace normal sounds. Murmurs are still advantageously grouped under two principal heads, the organic and the inorganic. The former are due to changes in the texture of the tissues in or about the valves. Their nature, localization and symptoms have in the main been satisfactorily established, through the combined work of clinicians and pathological anatomists. Inorganic murmurs are caused by a great variety of conditions, so many that they have never been summarized, and perhaps never will be, since exceptional reasons for them will occur from time to time. The entire topic of inorganic murmurs offers a fruitful field for research. But it lies beyond the confines of pathological anatomy. It is the domain of the clinical physiologist. Experimentation on the lower animals offers the simplest and surest method by which the nature and significance of inorganic murmurs can be shown. It is to be hoped that physiologists will appreciate the opportunities open before them, and will clear away the clouds that obscure this branch of cardiology. At present we have to content ourselves with a large number of traditions and hypotheses in explaining the causation of murmurs of this type. The following claims are made: That inorganic murmurs are due (1) to altered composition of the blood, as in some anemias, though this theory lacks definiteness; (2) to neuroses, as in poisoning by tobacco, though the *modus operandi* is obscure; (3) to affections of the heart musculature, as in convalescence from fevers, though we do not know whether the muscle itself or the nervous apparatus is at fault. We are reasonably sure, however, that valve weakness or inefficiency will produce these murmurs, as also pressure on a vessel such as the pulmonary artery, because it is a matter of proof, but there must be other causes that we do not even suspect. So we must often assume that any statement as to the cause of such a murmur is conjectural. Physicians will yet do well

to hesitate before launching a positive opinion on such uncertain matters.

For the present, inorganic murmurs are conveniently divided into (1) cardio-functional, (2) cardio-respiratory, (3) venous, (4) arterial. The cardio-functional murmur is generally held to be short and breezy, as in small leaks, but it may sometimes be long and blowing, as in laceration from heart strain. It is not transmitted far, is fleeting, and is apt to occur in anemias, though it may often be heard in apparent health. Hamill and Le Boutillier¹¹ believe that inorganic,—i.e. cardio-functional,—murmurs are due to distension of the conus arteriosus. They found them in 53 out of 80 children classed as normal. The characteristic murmurs were long and blowing, never entirely obliterating the first sound, and heard best over the second and third left spaces. Though such murmurs are mainly systolic, they may be diastolic. Cardio-respiratory murmurs, the second on the list, are due to the expansion or contraction of air contained in hollow organs or spaces compressed during respiratory action. According to Schlieps,¹⁰ two-thirds of the inorganic murmurs of children are due to weakness of heart muscles. They are best heard over the root of the aorta or pulmonary artery; sometimes over the left ventricle. These murmurs move to and fro, however, come and go, and are more altered by posture than organic murmurs. They are abolished after forced expiration, and this is their most important feature for the diagnostician. Being so common, they are usually ignored. Besides, they have no special significance. Murmurs of venous origin, diastolic in character, are often heard in the neck in anemia. They can be produced by pressure on the jugular bulb, or veins adjacent to it, or by turning the neck slowly to the side opposite to the one where pressure is made. Dilatation of the aortic arch will produce systolic arterial murmurs; they are best marked in arteriosclerosis, but when present in this condition will be difficult to differentiate from those of aortic stenosis. Pressure on any arteriosclerotic artery may produce systolic murmurs.

The venous pulse is capable of furnishing more varieties of information as to the character of cardiovascular movements than the arterial pulse, as may be seen by a close study of the venous tracings in polygrams. The A-wave of the jugular indicates, approximately,

auricular contraction; the C-wave an impression made on the tracing by the impulse in the carotid, while the V-wave corresponds approximately to the dicrotic wave in the carotid. The notch after the A-wave marks the beginning of the carotid upstroke; that after the C-wave the limit of auricular relaxation; the depression after the V-wave the end of jugular and auricular relaxation,—both the latter approximately.

The phlebogram gives a record of the activities in both right auricle and right ventricle, and in the left ventricle through the carotid impulse; the sphygmograph or spring recorder notes those of the left auricle and left ventricle, and with the cardiograph occasionally that in the right ventricle. The two instruments in combination with a chronograph give the most complete register obtainable of cardiovascular and respiratory movements, recording time, rapidity, rhythm, and comparative force. Tracings made in this manner surpass those of the electrocardiograph in these respects, but they sometimes show variations in the venous tracings due to causes imperfectly understood, but attributed by Mackenzie¹² to the low pressure in the veins, to posture, and to the slow rate of the venous current. It must be borne in mind, however, that just as cardiac cycles are not, even in health, invariably of the same length, so neither jugular nor auricular waves are constantly of equal length or similar contour. These facts may serve to explain some of the difficulties met with in deciphering the tracings. But there is another important source of error, which is that the phlebograms thus far made are not automatic like electrocardiograms, but like the sphygmogram are influenced by the personal equation. Perhaps this objection to them will never be overcome.

The term auricular flutter, first used by MacWilliams, is at present used to characterize rapid contractions of the auricle that reach to from 150 to 350 or more vibrations per minute, where the ratio of auricular to ventricular contractions is usually about 2:1; but where the pulse falls to a very low point, as to the rate of 28 for example, while the auricle beats 280 times per minute, the ratio will naturally be 10:1, and this happened in one of Mackenzie's patients. The electrocardiograph is the only instrument that can register these very rapid vibrations. There is, however, a close relation between auricular fibrillation and auricular flutter, for it has

been possible by the use of digitalis to transform the latter into the former, so that the difference appears to be one of degree rather than of kind. Auricular fibrillation can be shown by a sphygmogram, arteriogram, or cardiogram.

Auricular fibrillation, discovered by Cushny and Edmonds in 1905, was found to be a peculiar condition of the auricular walls, in which certain component parts contract independently of one another and arrhythmically, so that auricular contraction as a whole is at a standstill. It is seen in what was called by Mackenzie nodal rhythm by Hering the permanently irregular pulse; also in heart block. The special clinical characteristic is that the cardiac cycle, usually rapid, varies so much that there is no sequence of arterial beats of the same length. The practical importance of a rapid diagnosis lies in the fact that the condition is capable of relief by digitalis or strophanthus, given to the point of reducing the adult pulse to 80.

Ventricular fibrillation and flutter are not so well understood, but a few facts have been discovered in relation to them by means of the joint use of the electrocardiograph and myograph, through animal experimentation. For by tying the left coronary artery or obstructing the flow of blood in the right coronary, irritating a papillary muscle, or the lower corner of the left ventricle, or the cutaneous surface of the latter, contractions have been made to take place, the rate running as high as 400 per minute, it has been said. On removing the exciting cause the contractions ceased. In one instance the differential diagnosis was made by Hoffmann¹³ in a human subject, by means of the electrocardiograph. This instrument operates automatically, and is therefore free from the errors occurring in the use of ordinary polygraphic machines. It records auricular and ventricular time, rapidity, force, and rhythm, and is useful in some forms of arrhythmia, especially where there is more or less complete auriculo-ventricular dissociation; in auricular or ventricular fibrillation or flutter, to record the time and comparative force of the contractions; and as a means of controlling polygraphic records. It is so expensive as to be prohibitive in general practice, so that in its present form it cannot come into common use.

The author's spring recorder registers automatically all the waves of the Einthoven electrocardiogram, showing with a chronograph (Jacquet or electrical) the rapidity, rhythm and comparative force

of the heart action; and contemporaneously, by means of a Mackenzie receiver and Hoyt pen-arm, the characteristic waves of the phlebogram. The complete polygram can be taken by the individual to be examined without outside assistance. The kymograph used is the slow and fast combination model of the Harvard Apparatus Company of Boston.

Blood pressure instruments are of many kinds. They are actuated by metallic springs, air, water, or have mercurial gauges. The selection of a suitable instrument should depend on the use to which it is to be applied. The spring instruments, of which there are many models, are the simplest and cheapest, and are small enough to be carried conveniently in the pocket, but as the spring loses its strength or is affected by temperature or moisture the index has to be readjusted from time to time to the zero mark. Bishop's water instrument is simple and inexpensive; it is best suited for office practice. The aneroid instruments are simple, comparatively inexpensive, and can be carried in the pocket; they register both systolic and diastolic pressure, and are constantly being improved by their makers. Mercurial instruments are specially adapted for physiological, clinical and therapeutic laboratories and for office rather than outside work. While more accurate than other instruments, an error of from 3 to 20 mm. Hg. may be expected in estimating even maximal pressure. In the best class of instruments, however, the error is comparatively small. Diastolic readings are liable to much greater error than systolic, under any circumstances. For when the method used is that of palpation of the radial pulse, accuracy varies with the tactile sense of the examiner, while by the new auscultatory method, though better results are obtained theoretically, the readings will be unreliable if the examiner's hearing is defective, or the patient's general circulation is poor. For the reasons given, life insurance examiners are not expected to give special weight to diastolic readings. They offer too large an opportunity for error.

Pulse pressure, now generally accepted as a term indicating the difference between systolic and diastolic pressures, should be an important aid in diagnosis. Theoretically it is; practically it is not, as yet. But if sphygmomanometers continue to be improved with the rapidity that has recently been shown, there will be a gradual elimi-

nation of present sources of error, and correspondingly pulse pressure will have an increased value.

Schapiro's¹⁴ method of testing cardiac efficiency consists, as is generally known, of taking the pulse rate first in the recumbent and then in the erect position. In health there should be an increase in rate of from three to ten beats per minute. In the weak heart, however, there is an absence of this increase, or even a diminution. This method is better than that of Graüpnér,¹⁵ which consists in taking the pulse rate before and after exercise, such as walking rapidly around a physician's office. In the efficient heart the rate should gradually rise during the exercise and fall rapidly after it is over, while inefficient hearts either fail to react, or react but slightly, or if the rate rises the increase is maintained for a considerable time. This method is open to the objection that the term "exercise" is rather indefinite. What one examiner would consider moderate exercise would perhaps be regarded as immoderate by another, and the results to be expected offer no proper standard of comparison.

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THE RESPIRATION IN HEART DISEASE

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It is a fact well known to every practitioner of medicine that there are a number of cardiac affections characterized by extensive

anatomic alterations which, nevertheless, may occur without any respiratory disturbance of an objective or subjective nature. I have in mind not only those patients who live in blessed ignorance of the severity of their heart trouble, but also those who, on account of disease other than of the heart, consult a physician. It is rather astonishing, therefore, to find in special works even the assertion that every heart patient is suffering more or less with shortness of breath. This absurd opinion can be successfully contradicted by every painstaking practitioner. In like manner the widely disseminated error should be rejected and eradicated according to which a respiratory disturbance in the presence of sound respiratory organs with certainty indicates a lesion of the circulatory apparatus.

The most important representative of the symptom-group interesting us on this occasion is the genuine cardiac dyspnea, the form of labored breathing concurring with a feeling of air-hunger. Cardiac dyspnea always supervenes when the function of the *left* ventricle is insufficient, so that this draws but a scanty amount of blood from the lesser circulation. The direct consequence of this ventricular insufficiency is a retardation of the blood current in the alveoli of the lungs, a condition generally known as pulmonary engorgement. Cardiac dyspnea is constant only when there are very extensive changes in the heart muscle, or when minor circulatory disturbances are associated with changes in the respiratory organs, as, for instance, with catarrhal conditions of the air passages, with pulmonary emphysema, exudates in the pleural cavities, etc. In all other instances cardiac dyspnea supervenes only then when the heart is overburdened. Without exception, this ensues nearly always after bodily exertion; on the hand of the muscle force which a heart patient can exhibit without undue fatigue and evil consequences, we are thus enabled to estimate the degree of resistance and activity of his heart. He who already becomes short of breath when walking on a level road appears to be more affected than he who only becomes short-winded on ascending hills or stairways.

It must be emphasized, however, that the criterion just mentioned is only applicable to the dyspnea itself and not to the palpitation. As long, therefore, as the structure of the heart muscle, especially at the site of the left ventricle, remains intact, we hear

no complaint from the patient when there occurs some shortness of breath after bodily exertion. This circumstance is particularly surprising in far-advanced deformities of the aorta (especially when they are syphilitic in character), which usually involve the lesser circulation only after heart muscle-insufficiency has supervened.

The characteristic behavior of valvular defects is interesting. As far as his general efficiency is concerned, the owner of a well-compensated mitral insufficiency does not in the least differ from an individual with an entirely sound heart. We frequently meet with heart patients of this sort who, being quite well, have attained an advanced age; they report that until lately, i.e. until the onset of manifestations of decompensation, they could perform without effort certain athletic feats, or a good deal of bodily work. Compensated aortic insufficiency, as a rule, is also not accompanied by an occasional attack of cardiac dyspnea, though a patient with this affection cannot, usually, move about as freely as one with mitral insufficiency, for the reason that when he exerts himself, a danger signal—distressing palpitation—will make its appearance. Mitral stenosis, on the other hand, is a valvular disease nearly always embarrassing the respiration. This affection does not permit of greater bodily exertion even when compensation is well established.

The type of difficult breathing just dwelled upon is generally and briefly designated as cardiac dyspnea, as it is, contrary to the other respiratory disturbances following the affections of the circulatory apparatus, the most common occurrence, and as it is, so to say, a natural result of the pathologically altered conditions. As already mentioned, the change in the lesser circulation underlying the respiratory difficulty is the logical sequence of the inefficiency of the musculature of the left heart. In mitral disease, the alteration of the pulmonary circulation is facilitated for the reason that between the left auricle and left ventricle, i.e. at the site where there is very little motor force to accomplish compensation, there is situated a valvular defect or a stenosis of the blood channel. The term "mitralization," coined by Huchard, is very appropriate for that stage of all organic cardiac affections, in which cardiac dyspnea is the most significant of all the symptoms. Instead of speaking of cardiac dyspnea, the condition treated upon in the

foregoing, it may, therefore, be quite proper to employ the term "*mitral dyspnea*."

Remembering the clinical state that the expression mitral dyspnea is meant to designate, it will not be difficult to differentiate from it that peculiar labored breathing found in patients with a strong, regular pulse, a very high blood pressure and a pronounced cardiac hypertrophy. In these cases no circulatory disturbance, and be it ever so insignificant, can be demonstrated. I still hold the supposition, which I have entertained for years, that the substrate in these cases is a strangulation of the right ventricle between the greatly enlarged left ventricle and the chest wall.

The right ventricle is situated like a shallow cup around the anterior surface of the much hypertrophied left ventricle. Recalling now with what degree of intensity the left ventricle transmits its movements to the chest wall, it will be understood that the relatively soft right ventricle must be greatly hindered in its activity. The observation of many patients affected in this manner is significant: their dyspnea is increased when lying on the *right* side, for the reason that when in this position the heart, on account of its increased weight, descends to the isthmus which is formed by skeletal portions protruding internally, i.e. spinal column and sternum, whereby the strangulation of the right ventricle becomes still more aggravated. This form of respiratory difficulty should be denominated "*high pressure dyspnea*."

How important it is to differentiate between mitral dyspnea and high pressure dyspnea is already evinced by the difference in treatment. In the first type cardiac remedies, like digitalis, are indicated and mostly act beneficially; in the other form of respiratory difficulty therapeutic agents of this class never avail anything.

The nervous disturbances of respiration give rise to frequent diagnostic mistakes. Such errors may, however, be avoided if the anamnesis is properly ascertained. Nervous respiratory trouble is a condition with definite subjective symptoms. While the respiratory disturbances heretofore dwelled upon are associated with a feeling of air-hunger, the nervous patients complain of the sensation of a greatly impeded breathing, a sensation appearing well founded on account of the existing circumstances, which latter imply an innervation-disturbance of the most important respiratory

muscle—the diaphragm. The "*Atemsperre*" (*respiratory blockade*), a term by which I have proposed to designate this condition, is now recognized by clinicians in general.

Unlike mitral dyspnea, the respiratory blockade is not called forth by bodily exertion, but by psychical excitement and by movements demanding well-regulated coördination. Such movements, for instance, are writing, piano-playing and hair-dressing. The respiratory blockade may also ensue when a person is reposing; it causes the patient to free himself of the heavy oppression by occasional inspiratory sighs. If the latter become very frequent and intense, they are a source of annoyance to the patient, as well as the uninitiated observer. The term "*Seufzerkrampf*" (sighing spasm), coined by me, seems to be well expressive of this condition.

The sighing spasm carries us in logical sequence to the paroxysmal respiratory disturbances of the cardiopath. The sighing spasm is somewhat related to the respiratory blockade, so is mitral dyspnea to cardiac asthma, and high pressure dyspnea to paroxysmal respiratory difficulty and Cheyne-Stokes respiration. In cardiac asthma the patient occupies most always a sitting posture, executing very forced, wheezing, mostly expiratorily prolonged respiratory movements. In this condition the patient makes every possible effort to call the auxiliary muscles of respiration into activity. Frequently there are also encountered in this state more or less audible moist râles.

An arteriosclerotic individual affected with paroxysmal respiratory difficulty also breathes by summoning all his strength. However, he does not give one the impression of an asthmatic patient who has to employ force against a mechanical obstruction of his respiration. Without an apparent motif, he executes his inspirations and expirations with great force until the unexplainable ravenous air-hunger is alleviated. A patient belonging to this class is greatly exhausted after an attack of short-breathing, and though his respiration at this time is but shallow and slow, it differs markedly from the respiratory standstill occurring in the wake of the Cheyne-Stokes breathing. Besides this, there is, of course, the characteristic behavior of the respiratory movements in Cheyne-

Stokes breathing that will differentiate this from all the other varieties of respiratory inefficiency.

Finally, I wish to draw attention to a peculiar respiratory disturbance, characterized by its sudden onset and its very brief duration, lasting but a few seconds. Its occurrence is generally associated with a sense of fear, especially when the disturbance supervenes in the night. Its brief duration excludes any diagnostic error; it ensues in very sensitive patients only, is caused by an extra-systole, and is, therefore, of no serious import.

We are to-day able to differentiate between the following respiratory disturbances that may arise in the course of heart affections: Mitral dyspnea; high pressure dyspnea; respiratory blockade; sighing spasm; paroxysmal respiratory disturbance; Cheyne-Stokes breathing, and extra-systolic dyspnea.

THE RELATION OF HIGH SYSTOLIC TO DIASTOLIC PRESSURE

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The increasing stress laid upon the practical importance of the diastolic or minimal pressure is widespread; and rightly so, according to all theoretical considerations. The diastolic pressure is supposed to represent the index of peripheral resistance, and upon its correct estimation much diagnostic and prognostic information may be obtained. Yet, until recently, the systolic or maximal pressure alone has been considered of any importance, and but little attention has been paid to the minimal pressure. Now, however, that the importance of the diastolic pressure is beginning to be recognized extensively, it is found that there is no criterion by which the relation between high systolic pressure and diastolic pressure may be established. Different authorities give figures for the normal systolic and diastolic pressures, as well as for the pulse pressure. For example, Barach and Marks¹ in 650 normal men found 92 per cent. to have diastolic pressures under 100 and only 14 to have

minimal pressures over 110, while in 629 of the men 88 per cent. had a pulse pressure between 20 and 70 mm. Hg. The fact does not seem to be recognized that if there is increased systolic pressure the minimal pressure does not increase *pari passu* with the maximal pressure and that as the maximal pressure increases the pulse pressure also increases, but without any definite relationship to the augmented maximal pressure. These statements have not been sufficiently emphasized to result in the publication of figures which, in a measure, might clear up the haziness of conception of the diastolic pressure, and establish some standard by which it could be determined in a given individual suffering with a disease associated with high blood pressure, whether the pulse pressure was abnormally high or low for such a case.

In an attempt to elucidate this problem, I have recently studied one hundred cases in whom the systolic blood pressure estimation was found to be over 160 mm. Hg. These ambulatory cases, from private and dispensary practice, were for the most part sufficiently well to carry on their usual daily occupations, or at least to walk to and from the consulting room. None of them presented severe or exaggerated types of their disorders. The great majority of them had numerous estimations made at approximately the same time of day and under the same general conditions, so that in most of the cases the average of the several readings has been used as the basis of the average pressure of that case.

The blood pressure readings were made by the auscultatory method, employing one of the standard mercury sphygmomanometers. The systolic reading was made as soon as the first clear tone reached the ear. The diastolic readings, in the majority of the cases, was made at the time of the so-called fourth phase, though some of the readings were made when the auscultatory sounds heard over the artery disappeared, the fifth phase. This is a possible source of error, in view of the conflicting opinions as to the correct interpretation of the time of occurrence of the diastolic pressure. Korotkow, in his original description of the auscultatory method of estimating blood pressure, considered the disappearance of sound to mark the diastolic pressure. Warfield², Taussig and Cook³, and more recently MacWilliams and Melvin⁴, in a long, thorough and careful paper, have attempted to show experimentally

that the diastolic pressure occurs at the time of the fourth phase. On the other hand, in another recent publication, Hooker and Southworth⁵, using the method of Einthoven and Geluk for the graphic registration, sustain Korotkow in his original contention. However, this discussion has always seemed to be an academic rather than a practical one, because only in very rare cases is there a difference of more than 5 mm. of Hg. between the fourth and fifth phases, if the exceptional cases of aortic insufficiency be excepted. In order to avoid other errors, the readings from cases of aortic insufficiency were excluded; the pressure of the cuff was sustained only sufficiently long to permit the gradual escape of the air; and the only other common fallacy of the auscultatory method, extreme low blood pressure, was, of course, omitted.

The figures of the maximal, minimal and pulse pressures of these one hundred cases were averaged in the following manner:

1. Average of all cases.
2. Average in cases with a systolic reading of over 180 mm. Hg.
3. Average in cases with systolic pressure over 200 mm. Hg.
4. Average of all cases with a systolic pressure between 160 and 180 mm. Hg.
5. Average in all cases between 180 and 200 mm. Hg.

The succeeding table gives these results:

	Number of cases	Maximal pressure	Minimal pressure	Difference
All cases.....	100	190.26	114.13	76.13
Cases over 180.....	67	194.34	122.24	74.10
Cases over 200.....	38	218.13	131.32	86.81
Cases between 160-180..	33	161.36	95.03	66.33
Cases between 180-200..	29	184.00	110.02	73.98

In addition to these results, the series is divided into four groups, according to the clinical diagnosis: first, the renal group; second, the cardiac; third, the arteriosclerotic, and, fourth, a miscellaneous group. It is, of course, manifestly impossible to differentiate sharply in many cases of cardio-vascular-renal disease between the various symptoms and physical findings and to say correctly in which system the most extensive pathological changes have taken place; nevertheless, each case has been carefully analyzed and put

into one of the groups according to the predominant functional disturbance. The fourth group contains the patients who had a high systolic pressure without any definite symptom or disturbance of functions referable to the heart, kidneys or blood vessels and who were seen because of some extraneous condition, such as neuritis, arthritis, carcinoma, etc., at which time the routine blood pressure estimations were made.

The underlying table will give the result of the various average pressures in these cases:

	Number of cases	Maximal pressure	Minimal pressure	Difference
Nephritic group.....	30	195.66	122.96	72.70
Cardiac group.....	24	189.87	104.87	85.00
Vascular group.....	18	188.44	120.39	68.05
Miscellaneous group....	18	169.78	94.45	75.30

DISCUSSION

In the first series of figures, probably the most interesting observation is the difference between the maximal and minimal pressure in all of the cases. It is usually taught that the diastolic pressure is higher than the figures here given, while the pulse pressure is correspondingly lowered. The second fact that these figures bring out is that in the cases in whom the systolic pressure ranged between 160 and 180 mm. Hg. there is a diastolic pressure of under 100 mm. Hg. This can be explained partially by the fact that eighteen of the thirty-three cases in whom the maximal pressure was under 180 were cases who presented no marked disturbance of the cardio-vascular-renal system.

It is impossible to state from these observations just what would be the expected increase in the minimal pressure as the maximal pressure increased. No definite relationship between the two can be established, nor is it to be expected; the number of cases is too few in the first place, and in the second place we are dealing with pathological conditions, not normal physiological ones. As a generalization it may be said that the rise in systolic pressure is much more marked than is the diastolic. The second group of figures are probably more instructive than the first. They confirm the theoretical considerations that increased peripheral resistance causes a

rise in the minimal pressure. In the two conditions in which there could be expected an increase in the resistance against which the heart must pump, the nephritic and vascular disorders, there is a very distinct and decided difference from the cardiac and miscellaneous conditions.

This is so well marked that it decidedly accentuates the diagnostic information gotten from the diastolic pressure and renders practical aid in the difficult undertaking of differentiating the main source of trouble from the less important, in persons who are able to be up and around and yet are subjects of extensive cardio-vascular-renal degeneration.

The last instructive point to be noted is the low diastolic pressure in patients suffering from various diseases which have no relationship to disease of the heart, blood vessels or kidneys. Such figures tend to prove that the systolic pressure is more readily influenced by extraneous factors, and that the diastolic pressure is the best criterion upon which to base a diagnosis of degenerative disease of the cardio-vascular-renal apparatus.

CONCLUSIONS

1. The theoretical importance of the diastolic pressure is sustained in actual practice.
2. The diastolic pressure in cases of high systolic pressure does not increase *pari-passu* with the systolic pressure.
3. Diastolic pressures of over one hundred and ten are indicative of renal or vascular disease, the latter being practically always accompanied by the former, and probably chiefly responsible for the increase of vascular tension.

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ACROMIAL RESPIRATORY SOUNDS

By JOSEPH H. BARACH

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In a study of the sound-conducting property of the bony framework of the thorax,¹ I called attention to the respiratory sounds which may be heard over the acromion process of the clavicle.

So far as I could determine at that time and since then, this was the first description of those findings, in our literature.

Later, Erdman² published a paper discussing the value of sound transmission as indicative of continuity of long bones, in fifteen cases of fractured clavicle. Erdman's observations had been previously made, but evidently remained unpublished.

An Italian surgeon—Vajana³ of Palermo, and Plesch⁴ of Budapest, utilized the value of sound transmission by simultaneous percussion of the long bones and auscultation with the stethophone.*

In cases of fracture—they noted the absence of transmitted sound. Andrews⁵ used the tuning fork for the same purpose.

Three years after Erdman's communication, Abrahams,⁶ in discussing the significance of this sign for the internist, states his belief that it is worth a place in physical diagnosis. Abrahams verifies my observations, that the clavicle transmits the various pulmonary sounds, normal and abnormal, from the underlying lung tissue and air passages, and that in thickening of the underlying tissues, the acromial sounds are accentuated accordingly. He goes farther, and I think much too far, in saying, that when very prominent these signs in healthy persons mean healed or arrested tuberculous processes. Abrahams also states that the broncho-vesicular breathing, spoken and whispered voice sounds are usually more distinct over the right acromion.

Recently, Magida⁷ working in the clinic of the Post-Graduate Hospital, studied a series of 52 cases of tuberculosis and concludes as Abrahams did, that accentuation and amplification of the ordinary auscultatory sounds of the apex, when heard over the acromial end of the clavicle, is a valuable aid in diagnosis of the first stage of tuberculous involvement of the apices, and that these evidences

*The author prefers the term stethophone to stethoscope (see Jour. A. M. A., Jan. 3, 1914).

should always be looked for; also that in the far-advanced stages of the disease, the transmission of sound becomes less distinct.

It is this last article which prompts me to bring the topic into re-consideration—as I believe many errors will be made if we offer the findings at the acromion too enthusiastically as evidence of apical involvement. Particularly so, since it is the apices of the lungs to which we habitually look for early evidences of tuberculosis.

Magida, working in the dispensary, examined 28 cases in the first stage of tuberculosis and found the sign present in all. Out of 14 cases which he classified as the second stage, he found it present in eight—and out of ten in the third stage—the sign was present in two.

Had Magida first examined a series of normal individuals, and pointed out the percentage in which he found the signs to be very prominently heard and could he have designated when the normal ends and the abnormal begins and then to have compared the findings in tuberculous cases—he would have come to a far different and more correct conclusion.

After my own daily observations, on the acromial sounds, covering a period of more than six years—I find myself in accord with Erdman, who found a bronchial whisper clearly transmitted in over 95 per cent. of a series of 300 normal individuals. That the spoken and whispered voice sounds are audible in over 66 per cent. of the cases, and the respiratory sounds, bronchial in character, were clearly audible in about 33 per cent. of the series.

It was my general impression that these figures were about right and even conservative; but to verify this statistically, and to make further observations, with the assistance of my colleague Dr. Wm. L. Marks, of the Carnegie Institute of Technology, I examined 50 young men. The chests of these young men beyond a doubt were perfectly healthy, and our findings were as follows:

Bronchial breathing—Very clear and in some cases loud bronchial breathing was present in 66 per cent. of the cases—and inaudible in 33 per cent. The bronchial breathing was distinctly louder on the left side in 12 cases and it was distinctly louder on the right side in 3 cases. In the others it was equal or absent.

Spoken voice—Louder on the left side in 35 cases, on the right side in 3 and of equal intensity in 10 cases. It was absent in 2 cases only or 4 per cent. of the series.

Whispered voice—Greater on the left side in 34 cases—on the right side in 6 cases; equal in 8 cases and inaudible in 2 cases, or 4 per cent. of the series.

Inspiratory sound—Louder on the left side in 10 cases, on the right side in 6 cases and of equal intensity in 25 cases. The inspiratory sound was inaudible on the right side in 19 cases and on the left side in 19 cases.

Expiratory sound—Louder on the left side in 19 cases—on the right side in 5 cases and of equal intensity in 23 cases. The expiratory sound was absent on the left side in 14 cases and on the right side in 16 cases.

It is readily seen from the above observations, that in the normal youth and adult—and in so far as we could see in this series, irrespective of body contour and general build—transmission of sound to the left clavicle is much greater than to the right.

In my first communication, I stated that the sounds are usually louder on the right side—without specifying that the subjects for my observation were mostly children under 12 years of age, unless my first observations were not extensive enough. My findings in adults show that there is a difference with the body development.

Method of eliciting the sounds—I quote from my original paper.⁸

“By placing the bell of the stethophone—(a bell of about the size used on the Ford stethophone) over the acromial end of the clavicle, and having the patient make deep respiratory efforts, typical bronchial breathing will be heard. When auscultating over a small clavicle, it will at times, be necessary to draw the skin up around the bell, to eliminate the external sounds. Not only is the bronchial breathing heard, but the spoken and whispered voice sounds are transmitted clearly, etc. etc.”

The patient must breathe with his mouth closed, as the oral cavity is an important factor in production of the auscultatory findings. The importance of the oral and nasal chambers, as resonators, partaking in the production of the respiratory sounds—I have previously discussed.

Production of these sounds—I have found thus far no reason for changing, in the main, my original ideas as to the production of these sounds at the acromial end of the clavicle.

(a) The sounds produced by air currents in the trachea are im-

parted to the manubrium sterni and transmitted by the clavicles to their distal ends. Changing position of the head (throwing the head far backward, which alters the position of the trachea) modifies the intensity of the sound.

(b) The intensity of these sounds as we hear them, is dependent upon the proximity of the trachea to the manubrium sterni, the sound-condensing and sound-conducting properties of the underlying lung, and also upon the accuracy with which we can apply the stethophone to the acromial end of the clavicle.

(c) I believe the sounds are louder at one or the other acromial ends, as the trachea lies more to the right or left side of the median line and as the right or left of the manubrium sterni and clavicle received more sound waves from the intervening tissues.

(d) In the normal, the acromial sounds, as I interpret them, are purely bronchial in character. Only when the sounds are distant and faint, do they resemble broncho-vesicular breathing.

If a broncho-vesicular sound were heard, it seems that the bronchial element would emanate from the trachea and the vesicular element from the lung underlying the clavicle. Or, as Fetterolf⁹ says, the broncho-vesicular breathing is produced simultaneously by the bronchial element from the main bronchus, and the vesicular element from the lung tissue adjoining the bronchus. I believe that we do not hear broncho-vesicular breathing at the acromion, but rather that the sounds we do hear are faint bronchial sounds.

Summary—We see then, that sound conduction by the clavicle occurs in normal chests, with but very few exceptions, and that the bronchial breathing and other transmitted sounds are louder on the left side, in most individuals.

Since these signs are prominently present in the normal—and much more prominent in some normals than in others—how are we to tell by them whether in one patient it represents a physiological or in another, a beginning pathological condition of the underlying lung? To begin auscultating over the acromion first, as has been suggested, would be in very many instances, to start out with an unfounded prejudice and to reach a biased conclusion.

Between the intensity of the sounds as they occur in pneumonia and in tuberculous consolidation of the apex, and between the normal sounds and the various râles which may be heard at times (I have

pointed out in my original communication) there is a vast difference.

But between the prominent findings at the acromion in the normal and the findings in the slightly or moderately diseased, I believe no one can differentiate with certainty and accuracy. I, therefore, believe that we should be very cautious in placing much reliance on the findings of marked transmission of sound alone, as being indicative of early involvement, or as indicating healed or arrested lesions of the apices of the lungs.

It is a common observation in my work, to find these signs less prominent in some cases, which I know to be tuberculous, than in other cases which I know are perfectly normal.

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PERCUSSION SIGN FOR DETECTING FLUID IN THE PLEURA

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The sign described below has given such accurate results in controlled observations and the findings have been so clear and devoid of ambiguity that, although the number of cases available for study has been limited, I believe the method should be reported and given a more extended trial.

This sign is produced by placing the pleximeter finger as near as possible at the base of the spinous process of the vertebra on a level with the suspected fluid and on the side opposite to it, and percuss-

ing diagonally though the body of the vertebra in the axis of the opposite lung.

If fluid is present the resulting note will be flat. If no fluid is present and the lung is consolidated or normal, the resulting note will be dull or resonant but not flat.

If the process is reversed, and diagonal percussion made through the body of the same vertebra toward a normal or consolidated lung opposite the fluid, the resulting note will be resonant or dull but not flat.

This method differs fundamentally from the usual method of spinal percussion, *viz.*, percussing directly over the spinous process in the axis of the center of the vertebral body. This gives a mixed note depending on the condition of the organs on both sides of the spinal column. The method of diagonal percussion here described gives in the same vertebra notes characteristic of the lung toward which the percussion is directed.

The following cases illustrate the use of this sign:

Case I. Tuberculous consolidation of the left lung with fluid in the left base. Right lung fairly clear. Diagonal percussion through the vertebræ from left to right gives a resonant note throughout. From right toward the left side the note is dull from above to the ninth spinous process, below which it is flat. Röntgenogram shows fluid and consolidation corresponding to above findings. Pleurocentesis was performed and fluid withdrawn.

Case II. Pneumonia of the right and left base with fluid in the left base. Diagonal spinal percussion toward the right gives a dull note through the lower dorsal vertebræ. Percussion toward the left gives a flat note below the eighth spinous process, the note above being dull. Pleurocentesis performed and fluid withdrawn.

Case III. Pneumonia of the right base—uncomplicated. Diagonal spinal percussion confirmed the other physical findings by giving a dull note toward the right base and a resonant note toward the left. No physical signs of fluid were found and the patient recovered uneventfully.

Case IV. Pneumonia of the right lower lobe with fluid in the right base. Diagonal spinal percussion gave a dull note when directed toward the right from the fourth to the seventh dorsal vertebræ; below the seventh the note was flat. Toward the left the

vertebræ gave a resonant note throughout. Röntgenogram confirmed the above findings, and pleurocentesis was performed and fluid withdrawn.

Case V. Tuberculous pleurisy of the right side with effusion; beginning pulmonary tuberculosis without consolidation. Diagonal percussion gave a resonant note when directed through the bodies of the vertebræ toward the left. Toward the right the note was resonant to the eighth dorsal spine, flat at the eighth and below. Röntgenogram confirmed above findings. Pleurocentesis was performed and fluid withdrawn.

Case VI. Pneumonia of the right and left base—uncomplicated. Diagonal percussion directed toward the right and toward the left gave a dull note through the bodies of the lower dorsal vertebræ. No signs of fluid were present and the patient made an uneventful recovery.

Case VII. Chronic pulmonary tuberculosis with thickened pleura at the left base; consolidation of the right and left apex and partial consolidation of the left base. Diagonal percussion toward the right gave a dull note above, resonant below. Toward the left the note was dull throughout.

Conclusions: Diagonal percussion through the bodies of the vertebræ directed toward the affected side is a valuable means of differentiating fluid in the pleura from consolidated lung or thickened pleura.

A flat note is produced only when fluid is present.

The percussion note varies in the same vertebra according to the condition of the tissues to the right and to the left of the body of the vertebra, and the differentiation is sharply defined and unequivocal.

SOME CLINICAL FEATURES OF ABDOMINAL PAIN AND TENDERNESS

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The following general remarks deal not with a disease but with a symptom. The variations in the character of abdominal pain and

tenderness are so many that it may be of interest to pay a little attention to some clinical features of this symptom.

ACUTE ABDOMINAL PAIN

In very many instances, the nature and location of abdominal painful symptoms are so characteristic that the significance and the source of the pain can be recognized without difficulty. In not a few cases, however, the interpretation is not so easy. Very often there is an unrealness about the abdominal pain; rigidity of the muscles is absent or there is abdominal rigidity but too little tenderness for the amount of rigidity. At times, the abdominal signs are not sufficient to explain the appearance of the patient, or the patient's general condition is much too good for the severe abdominal symptoms.

It is sometimes very difficult to come to a conclusion in patients who have acute abdominal pain and tenderness with fever and evidence of an intestinal disturbance, and one is often in doubt whether one has to do with an acute appendicitis (in which operative interference is indicated) or an intestinal disturbance which will disappear promptly after the proper internal remedies. I have often felt considerable concern when I have delayed or advised against operative interference in such a patient. After having reached a conclusion in a case of this kind it is a good plan to ask one's self: "What led you to advise against operation? Was it the fact that the symptoms were rather diffuse, that there was pain and tenderness on the left as well as on the right side? Was it because palpation was not positively tender or that for the amount of general disturbance there was not enough local rigidity? Or was it because peritoneal symptoms, such as nausea and vomiting, were wanting?" I am sure that every one has had cases where he has correctly concluded that there was not enough *locally* to explain the general symptoms or where there were too few general symptoms to explain the local signs. It is sometimes exceedingly difficult to differentiate between abdominal pain and tenderness due to a surgical lesion and the referred pain due to a pulmonary or pleural affection, a menstrual fever with pain and tenderness low down on the right side from congestion of an ovary and tube; an intestinal intoxication; beginning typhoid fever; ureteral calculus; etc. One should

never fail to recognize the severe abdominal colic with the board-like rigidity of the abdominal muscles which are early symptoms of a perforative lesion of a hollow abdominal viscus. Whether we have to deal with a perforation of the intestine in typhoid fever, perforation of the bowels from some other cause, or perforation of an ulcer or tumor of the stomach or duodenum, the sudden abdominal pain, the constantly recurring colic, and the board-like rigidity of the muscles are very characteristic. The acute pain of renal or ureteral colic or of cholelithiasis is generally easily differentiated from the pain which characterizes a perforation of a hollow organ. The early pain of intestinal obstruction is never as violent as the pain of perforation and is more regularly intermittent, and the same is true of pain due to torsion of an abdominal viscus.

In the acute abdominal pain of gall-bladder disease the physical signs usually point to the source of the trouble; the same thing is true of many other intraabdominal affections which can not be mentioned here.

To sum up the subject of acute abdominal pain, I would say: acute abdominal pain and acute and persisting localized tenderness usually mean a surgical lesion which requires surgical interference, especially when accompanied by general symptoms. Acute localized pain without tenderness often occurs in conditions in which immediate operation is unnecessary; acute abdominal pain without apparent tenderness in very fat individuals must always be watched with considerable concern. The signs may be concealed on account of the large amount of fat which surrounds the affected organ and very few symptoms in a fat person may be the only evidence of a severe abdominal lesion (pancreatitis, mesenteric thrombosis, etc.)

ABDOMINAL PAIN WHICH IS NOT OF AN ACUTE CHARACTER

It is more important and more difficult to make some remarks on this subject. Nowadays operations are so easy that we are sometimes led to advise surgical interference on too slight indications. It is true that by such a course we had laid ourselves open to critical insinuations by Bernard Shaw and by more unjustified remarks by writers of a lower order, such as Barnesby.

There are a host of abdominal painful disturbances that patients suffer from which are a puzzle to the physician, and it is especially

of these that I want to say a few words. You all know those unfortunate women who complain of frequent or continuous slight abdominal pain. Physical examination fails to reveal anything excepting general abdominal tenderness, perhaps more marked in one or the other location. Some of the patients are "nervous" women, but not a few are in perfect health. It is wrong to tell these patients that they have nothing the matter with them and to send them away,—often into the hands of quacks, Christian Scientists or faith healers. Nor does it help to characterize the condition by vague names, to speak of painful aortas, of neuralgia of the sympathetic (Buch), etc. The operative treatment gives few results. The appendix is removed, the kidneys sewn into place, the gall-bladder drained, various operations done on the uterus, tubes and ovaries. And after these "surgical decorations," as William Mayo calls them, the patients are often as badly off as ever. I think we must recognize that we know very little of many conditions of this kind. There are fads in medicine, and the latest is to explain the symptoms as due to a mobile cecum (the German view) or to a membrane preventing freedom of peristalsis (the American view); while the one or the other may be true, it is probable that in most instances both are wrong. Some of the patients are entirely relieved by an operation. We open the abdomen and remove an apparently normal or slightly diseased appendix,—and the patient is relieved,—not because the appendix has been removed, but because the operation has caused some profound change in the abdomen whose nature we do not understand. The surgeon is not justified in stating that the symptoms were due to the appendix even if the appendix is found not quite normal because only too often the patient is not relieved. If the patient is relieved by the removal of the appendix, we should not, as I have said, conclude that the patient had a chronic appendicitis. If Wilms had sutured up a somewhat movable cecum, he would have said that it was a cecum mobile; if Jackson's membrane had been divided that would have cured the patient; but Lane would have demanded an ileocolostomy at least, if not an extirpation of the entire colon, and would have blamed the good result on his operation. I have twice removed a spinal tumor from a patient whose appendix had been removed, followed by an operation on the gall-bladder, and in one

case by the removal of the entire uterus. In both patients an abdominal wall tenderness, due to nerve root irritation, had been mistaken for an intraabdominal pain. I have twice seen a patient, who had been sent to the hospital for chronic appendicitis because of tenderness in the right iliac region, in whom the pain and tenderness was found to be due to nerve root compression in the course of Pott's Disease. You all know that mistakes have been made and abdominal operations have been performed for the gastric crises of tabes and for the abdominal symptoms which occur in the erythema group of skin diseases (Osler).

After all has been said, however, there do remain a number of patients in whom fixation of a movable kidney, removal of bands or veils on the intestine, etc., give relief to symptoms, but, all in all, you must agree with me that in not a few cases of this kind with vague abdominal symptoms, abdominal surgery has failed most ingloriously and that we should be more and more careful before we advise operation.

These views may seem to you iconoclastic, but I believe they contain more than a germ of truth. On the other hand, one must never forget that there are many abdominal conditions of serious nature that give vague abdominal symptoms. Whenever a patient complains, he or she must be carefully examined; not so rarely a real lesion will be discovered,—a fibroid which causes intestinal disturbances, stones in the gall-bladder which cause indefinite abdominal disturbance, ureteral calculi which give symptoms more of discomfort than of real pain, and the like. The appearance of frequent slight colicky pain in a patient past middle life is always of significance; the persistent hollow feeling and epigastric discomfort of gastric or duodenal ulcer is well known. All of these cases, however, can usually be recognized sooner or later, and I am only mentioning them in passing. My object in making these remarks is to call your attention again to those vague intraabdominal symptoms of pain and tenderness which are so frequently met with in women, which are so frequently operated upon, in which no lesion is found to explain the symptoms, or a lesion is found which is supposed to be the cause of the symptoms, but in which no benefit is obtained from the surgical interference,—all of which emphasizes the importance of conservatism in this difficult class of cases.

SOME TYPES OF CUTANEOUS SARCOMA

A REPORT OF SEVEN CASES

By HOWARD FOX

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In the following series of cases, three types of cutaneous sarcoma are represented. They include the melanotic and large round-celled types of the disease, which are very malignant, and the form of sarcoma described by Kaposi, which is relatively benign. The diagnosis in all of these cases was fairly certain from a clinical standpoint, though it was not possible in every case to confirm this by histological examination. The ages of the patients varied from twenty-seven to seventy-seven years, four of them being males and three females.

The first four cases reported are of the melanotic type of sarcoma, the most malignant form of the disease. Indeed there are few fatal diseases so insidious and apparently harmless at their outset as melanotic sarcoma. It is hard to realize that the insignificant black spots shown in one of the accompanying illustrations (Fig. 1) foretell with absolute certainty the death of their unfortunate possessor. Frequently having its origin in a pigmented mole, a melanotic sarcoma is not apt to greatly alarm the patient until metastases have occurred and the disease is beyond the power of the surgeon to arrest. It is not only the patient, however, but frequently the physician who fails to recognize the gravity of one of these tumors, which are the most rapidly fatal of all the malignant neoplasms. Even though the physician may suspect the presence of a melanotic sarcoma when a pigmented nevus suddenly begins to enlarge, he frequently fails to realize the importance of its quick and thorough eradication. To remove such a tumor by any except a wide incision is entirely useless, while to cut into the growth, as was evidently done in Case I, is equivalent to signing the patient's death warrant. The fifth case apparently originated in a pigmented mole, the microscope showing the presence of a large round-celled type of sarcoma.

The last two cases represent the Kaposi type of the disease known as idiopathic multiple pigmented sarcoma. This is the form that is frequently confined to the extremities and which may exist for many years before causing the death of the patient.

The histories of the seven cases are as follows:

Case I. March 2, 1909. The patient, Mrs. Rose A., was a woman thirty years of age, born in Russia, the mother of four children. She was referred by Dr. Louis Spanier to my father, Dr. George Henry Fox, with whom I had the opportunity of observing her several times. She stated that about three years previously a dark-colored mole upon the left scapular region began to enlarge rather suddenly and without apparent cause. About two years later (thirteen months before we saw her) the tumor was excised by a physician. During the period of thirteen months from the time of this operation to the first visit to us, she had noticed the gradual appearance of a few pinhead-sized blackish spots upon the trunk. Three of these lesions, one about the nipple and two upon the thighs, had been cauterized by still another physician whom she had consulted.

The patient appeared to be in perfectly good health. Between the border of the left scapula and the vertebral column, she presented a somewhat hypertrophied scar, of a crucial shape, apparently the result of a badly healing wound. Scattered over the back were eight pinhead-sized smooth, blackish spots, not apparently elevated above the surface of the skin. There were three similar lesions about the hips. When the patient was seen later, on August 4th, the black spots had increased in number. About twenty-five could now be counted upon the back and about fifty upon the chest and abdomen, varying from a small pinhead to a split pea in size. At the upper part of the scar following the original excision there was a black, warty, elevated, rounded tumor of the diameter of a cent.

Through the courtesy of Dr. Alfred Meyer, I am enabled to give the subsequent history of this patient, from some notes having been kindly given me by Dr. Herman Goldenberg. The patient was admitted to the service of Dr. Meyer at the Mt. Sinai Hospital on November 21, 1909, by which time the disease had rapidly progressed and showed extensive involvement of the other structures beside the skin. The hospital record states there were now numerous lesions on the chest, back and extremities, some of them being distinct tumors, raised above the surface. There were several lesions on the lower jaw and upon the feet. Over the right iliac

region there was a pedunculated, hard, brownish, slightly ulcerated tumor, resembling a cherry pit in size and shape. A similar but somewhat softer and smaller tumor was situated in the left axilla. Numerous small, hard axillary glands could be felt and there was also a marked involvement of the posterior cervical glands upon the right side. On the left lower gum beyond the last tooth, there was a black, soft, somewhat movable tumor. The liver was enlarged and nodular and presented a hard, egg-sized mass in the region of the gall-bladder, movable with respiration. The spleen was also enlarged and rough. A distinct hard nodule, the size of a hazel nut, was also felt within the abdominal wall. Examination of the blood showed 14 per cent. of hemoglobin and 8,200 white cells. The fundus of the eyes were negative. On December 20th the glands were still increasing in size, but no new lesions were noted in the skin. On December 23d the hemoglobin was 65 per cent. and the red cells numbered 3,240,000. The patient suffered from nausea, vomiting and severe headaches. A radiogram showed the presence of the new growth in the shaft of the humerus and the glenoid cavity and acromion process of the scapula. A histological examination of one of the tumors proved it to be a melanotic sarcoma. An examination of the urine showed the presence of melanin. In addition to symptomatic treatment, the patient was given X-ray exposures and arsenic. Her condition continued to become rapidly worse and she left the hospital on December 29th, returning to her home, where she died about a month later.

Case II. June 22, 1910. The patient, Isaac S., was a man fifty-nine years of age, born in Russia, a typesetter by occupation. He stated that about a year previously he had noticed a pea-sized flat, black spot over the left shoulder. This later became broader and elevated and was then cauterized by a physician. Six months before I saw him, the lesion had attained the size of a ten-cent piece and caused severe itching, according to his statement. It was then excised by his physician. About two weeks later an "abscess" appeared in the left axilla, which opened and healed spontaneously. Six weeks after the removal of the black lesion upon the shoulder a recurrence was noted in the form of a black, pea-sized nodule, followed later by others of a similar size. Six weeks previously a small nodule had appeared in a scar in the left axilla.

Upon examination the patient appeared to be in excellent health. At the angle of the left scapula there was a circular smooth scar, the size of a dime, and at the border of the scar were two hard, elevated, smooth, rounded, black, pea-sized nodules. A short distance from the scar were two more nodules of similar size and appearance. At the edge of the scar were also several pin-point, black spots, not elevated above the surface. In the left axilla there was a linear scar about an inch in length, showing a split pea-sized, blackish nodule at its center.

Case III. March 2, 1909. The patient, Philip S., was a tailor, thirty-five years of age. The family and personal history was negative and there was no history of a pre-existing nevus as a possible starting point for the new growth. The patient was presented by Dr. J. F. Aitken before the Dermatological Section of the Academy of Medicine (Jour. Cutan. Dis., 1909, XXVII, 410), with the following history and description of the lesions: "About eighteen months ago there developed a small black papule, about the size of a split pea, on the outer side of the left foot, one inch below the malleolus, which gradually increased until it attained the size of a cherry, when it was excised by the family physician. About two months subsequently there appeared simultaneously several pea-sized, hemispherical, bluish, black papules on the dorsum and outer side of the same foot, slightly yielding, but not painful, on pressure; slowly increasing in size until at present the dorsum presents several clearly aggregated and four coalesced nodules, ranging in size from a marble to a walnut, some of which are covered with crusts, and others presenting a fungating surface, emitting a foul odor. There are also several small, black, firm, elastic globules, irregularly scattered on the upper and inner dorsal surface, apparently arising from the healthy skin and with no inflammatory base. The leg is considerably enlarged and very painful from existing lymphangitis. There are also four black specks, very superficial, on the outer and upper third of the leg, probably the starting point for the development of other lesions."

The patient was shown nine months later by Dr. G. H. Fox before the New York Dermatological Society (Jour. Cutan. Dis., 1910, XXVIII, 260) and showed great improvement as the result of treatment. As he had absolutely refused an amputation of the leg,



Case I.
Melanotic Sarcoma.

Case III.
Melanotic Sarcoma.

Case II.
Melanotic Sarcoma.

Case IV.
Melanotic Sarcoma.



Case V.
Large Round Cell Sarcoma.

Case VI.
Multiple Pigmented Sarcoma (Kaposi).

Case VII.
Multiple Pigmented Sarcoma (Kaposi).

SOME TYPES OF CUTANEOUS SARCOMA
Howard Fox

it had been necessary to employ more conservative methods of treatment. He had been given injections of thirty minims of Coley's fluid at intervals of three weeks, the injections being followed by chills and a rise of temperature. He had also received forty X-ray exposures, and recently some of the tumors which had decreased in size as a result of the X-ray treatment were excised and cauterized with acid nitrate of mercury. The improvement, according to the opinion of some of the members, was "very marked." The patient was shortly after that lost to observation.

Case IV. December 14, 1910. The patient, Josephine L., was a woman seventy-five years of age. One year ago she received a traumatism of the right thumb, followed eventually by shedding of the nail. Since then, according to her statement, the present lesion gradually made its appearance. This consisted of a soft, dark brownish growth, involving the nail-bed of the right thumb. It tended to bleed easily upon slight traumatism, but showed no ulceration. There was no glandular involvement and the patient appeared to be in good health. No histological examination was made and the patient failed to return for further observation or treatment.

Case V. January 12, 1910. The patient, Anna S., was a German woman twenty-seven years of age. Since birth she had had a dark brown, smooth spot upon the right shoulder. About two years ago, without any apparent cause, this had begun to enlarge peripherally till it had attained the size of a quarter. It became somewhat reddish in color, but still smooth, and not raised above the surface of the skin. About six months ago the lesion became slightly abraded from scratching. It gradually enlarged and attained its maximum size about two months ago. Five days ago, following the injection of potassium iodide, a general pustular eruption appeared upon the forehead, chest and back. At the same time the tumor upon the shoulder became raised by an inflammatory mass beneath.

On examination the patient presented a circumscribed soft mass the size of a hen's egg, upon the acromion process of the right scapula. It consisted of an upper dark brownish, slightly pedunculated portion, lying upon a reddish, slightly tender, sessile, inflammatory mass. Around the base of this lower portion of the mass was a sharply bordered fringe of brownish pigmented skin. The tumor

and axillary contents were removed on February 8, 1910, but unfortunately recurred, the patient dying on August 2, 1910. The pathological report showed the presence of a large, round-cell sarcoma of both tumor and axillary glands.

Case VI. June 18, 1914. The patient, Peter C., was an Italian, seventy-seven years of age, a cabinet-maker by occupation (patient of Dr. B. F. Ochs). His family history was negative. For many years he had suffered from pains in the knees, which he considered to be rheumatism. With this exception, he had always been a very strong and healthy man. The present eruption first appeared about four years ago in the form of pinhead spots about the ankles and lower third of both legs. These had gradually increased in number, none of them, according to the patient's statement, ever having disappeared. During the past five months he had complained of pain in the soles and in the wrists, the pain being sufficient to prevent sleep. He also complained of some itching of the lesions, which caused him to rub rather than to scratch them.

The eruption consisted of numerous, solid, pinhead to bean-sized tumors, some of them coalescing to form areas the size of the palm. They were round, elevated, mostly smooth, purplish and showed no objective evidences of scratching. The greater part of the eruption was situated on the dorsal surface and instep of the feet and the lower two-thirds of the legs. It was fairly symmetrical and was somewhat more extensive on the anterior than on the posterior surface of the legs. On the dorsal surface of the feet, there were flattened verrucous lesions suggesting a lichen planus verrucosus. On the upper third of the inner surface of the right thigh there were a half-dozen lesions, solid, infiltrated, elevated and smooth, the largest being the size of a half-dollar. The palms and soles were free. On the anterior surface of the left wrist were two bean-sized lesions. There was marked edema of both feet and legs, extending up to the knees and causing considerable difficulty in walking. The femoral glands of both sides, a single inguinal gland on the left side and an axillary gland of the right side were enlarged. The patient also suffered from a left-sided inguinal hernia, for which he wore a truss. With the exception of pain in the legs, and some difficulty in walking, the patient appeared to be a robust and healthy man for his age.

Case VII. August 3, 1912. The patient, Israel C., was a Russian, seventy-six years of age. His father had lived to be ninety-seven years of age, his mother had died in childbirth at the age of fifty. He was the father of nineteen children, five of whom had died. He had always enjoyed good health until a year ago, when the present eruption had appeared. This consisted of a gradually increasing swelling of the left foot and the presence of pinhead-sized nodules, most of which had appeared during the last six months. When first examined, there were about twenty pinhead to large pea-sized, firm, hemispherical nodules, situated upon the dorsum of the left leg. The color of the lesions was slightly darker than that of the surrounding skin. There was considerable edema of the foot and pain, which caused difficulty in walking. The patient eventually entered the Lebanon Hospital, where the foot was amputated at the ankle on November 11, 1912. A histological examination made at that institution showed the presence of a typical sarcoma of the Kaposi type. When seen again at his home, on June 12, 1914, the patient appeared to be in good health. There was no recurrence upon the left leg and no glandular involvement. The right foot was slightly reddened and edematous, but no nodules were present.

PRIMARY FAMILY SPLENOHEPATOMEGALY (GAUCHER TYPE)

By HERMAN B. SHEFFIELD

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The baby A. K. came under my observation when four months old. The mother related the following history: Her first two children, ten and eight years old, respectively, are in perfect health; the third child and fourth child both died at the age of thirteen months or thereabouts from a disease which was diagnosed as an enlargement of the spleen. She brought this, her fifth, baby to me for the purpose of determining whether or not it was similarly affected. All of her children were breast-fed up to about one year of age. The baby in question weighed fourteen pounds and seemed normal in every way. Very careful examination failed to reveal the slightest enlargement of the spleen or any other physical or

mental abnormality. Being told by the mother that the previous, deceased, two infants showed distinct signs of abdominal enlargement at about three months of age, I did not hesitate to pronounce a favorable outcome for the last baby. I suggested, however, to the mother to let me see this baby every few months. Five months later I had again the opportunity to see the child. To my great surprise and dismay, I found the spleen about two inches below the border of the tenth rib, and the liver distinctly palpable. The abdomen was markedly distended and the inguinal glands were enlarged. The baby failed to gain in weight; indeed, had lost about two pounds, and assumed the characteristic clinical picture of marasmus, although the child continued to partake of the mother's milk and seemed free from any gastrointestinal disturbances. I saw the child repeatedly after this. The spleen and liver kept on assuming larger dimensions with great rapidity, so that at nineteen months of age the spleen reached the hypogastrium and the liver the umbilicus. Both of these organs were very hard, but smooth, and but slightly sensitive to the touch. On several occasions I advised an operation, splenectomy, but upon the recommendation of several other physicians whom she consulted on frequent occasions and who, in vain, endeavored to arrest the disease by means of arsenic, mercury and the iodides, she postponed the operation until it was too late to undertake. When the baby was reduced to mere skin and bone she finally consented to put the child in the N. Y. Polyclinic under the care of Dr. Sturmdorf. Its vitality, however, was too low to withstand the operation. And while at the hospital under observation and hoping also, possibly, to improve its general condition, it succumbed suddenly, most probably from rupture of the spleen, which is not an uncommon termination in these cases.

This highly interesting, as yet etiologically obscure, affection has been at first described by Dr. P. C. E. Gaucher (*De l'épithélioma primitif de la rate*, Paris, 1882), and, although until recently looked upon as an exceedingly rare affection, is not at all as rare as generally supposed. I have had occasion to report two cases (*Med. Record*, Nov. 4, 1911), and other observers have since recorded several of them. Dr. F. S. Mandelbaum, who has made a very exhaustive study of these cases, presents the following instructive

observations concerning their underlying pathologic anatomy:

"The lesions are found in the spleen, lymph nodes, bone marrow and liver. These organs show the presence of iron containing pigment, and large multinuclear cells with a characteristic cytoplasm. In the early cases peculiar large phagocytic cells arising from atypical large lymphocytes are found in the follicles (keimcentra) of the hemapoietic system. After leaving the follicles, these cells possess phagocytic qualities for a certain period. As a result of the phagocytosis the cells enlarge, the nature of the cytoplasm changes, and the cells acquire a characteristic vacuolated and wrinkled appearance. The cells are carried from the spleen through the portal system to the liver, where they are destroyed. The irritation produced by this destructive process gives rise to an increase in the intralobular connective tissue."

My diagnosis in the case under discussion was based upon the extraordinary enlargement of the spleen and liver; the absence of syphilis or tuberculosis, as revealed by the negative Wassermann and Von Pirquet reactions; the absence of characteristic blood changes; its failure to respond to any therapeutic measures; the gradual dark discoloration (not jaundice!) of the skin; the very protracted course, and, last but not least, the history of the affection having occurred and terminated fatally in two other children of the same family. In some of these cases a tendency to hemorrhages has been observed.

In the absence of a family history the diagnosis of primary splenomegaly (Gaucher) is almost impossible in its very early stages. With the first appearance of the splenic hypertrophy, we are most apt to think of rachitis or anemia pseudoleukemica infantum. Indeed, this erroneous diagnosis was made by two eminent clinicians, even though informed by the mother that two older children had succumbed to the same or a similar affection.

With the further advance of the disease, however, the diagnosis can readily be made by exclusion, as there is no other form of intense splenohepatic hypertrophy *without* characteristic concomitant blood changes, as is the case in this disease. It is very essential to diagnose these cases early, since apparently permanent recovery by means of splenectomy is possible, if the operation is undertaken early.

DIAGNOSIS OF CARCINOMA

I. LABORATORY METHODS FOR THE EARLY DIAGNOSIS OF CANCER

By MAX KAHN

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In the past two decades or so, quite a number of methods have been suggested for the early diagnosis of malignant neoplasms. Not one of the methods thus far recommended has proved specific and infallible. The enthusiastic claims of the originator of each laboratory procedure could not be corroborated by the various other workers in this field. Nevertheless, a combination of several methods may aid the clinician very much in the early diagnosis of cancer. The tests thus far suggested may be classified as follows:

A. Microscopical.

1. Examinations of shreds or pieces of tissue.
2. Examination for bacteria.
3. Examination for protozoa, etc.

B. Biological.

1. Hematological.

- a. Analysis for occult blood.
- b. Presence of specific bodies in blood.
- c. Serological.
 - i. Deviation of the complement.
 - ii. Anaphylactic studies.
 - iii. Presence of precipitins, lysins, hemolysins, etc.
 - iv. Presence of antitrypsin.
 - v. Toxicity of serum.
 - vi. The Abderhalden reaction.
 - vii. The Meistagmin reaction.

2. Biochemical.

- a. Gastric contents' analyses.
 - (1) The glycyl-tryptophan and other polypeptide reactions.
 - (2) The Salomon albumin test.
 - (3) Anaphylactic studies.
 - (4) Enzyme tests.
- b. Urinary analyses.
 - (1) Enzyme tests.
 - (2) Metabolism studies of nitrogen, sulphur and phosphorus.

C. Clinical methods.

1. Test diets—Glutzinski, etc.
2. Skin reactions and vaccine methods.

D. Chemical.

1. Analysis of gastric contents.
 - a. Presence of lactic, acetic, oleic acids, etc.
 - b. The hypoacidity determinations.
 - c. Tests for blood.
 - d. Analysis for nitrogen, albumin, phosphorus, etc.
2. Analysis of urine.
 - a. Colloidal nitrogen estimation.
 - b. Neutral sulphur determination.
 - c. Determination of oxyproteic acid.
 - d. Sundry other reactions.
3. Examination of puncture fluids from serous cavities.

While each of the above methods of investigation has given rise to much comment and dispute, the method of Abderhalden has by far attracted more attention and has been acclaimed by some as a very reliable test for cancer. I shall endeavor to touch on each method of cancer diagnosis, but I shall commence with the Abderhalden reaction.

A few years ago, Abderhalden found that there are developed in the blood of persons into whose circulation foreign proteins are injected ferments which will cause cleavage of these proteins to render them innocuous. Schmorl and Voit observed that during pregnancy cells of the chorionic villi become detached and are carried into the blood stream. By deductive logic, therefore, if the observations of Abderhalden, Schmorl and Voit are correct, blood serum of pregnant women will contain a ferment which would split the protein of the foreign material. This was found by a large number of observers to be the case. Going one step further, this reaction was applied to cancer, in which disease foreign substances are injected into the circulation from the neoplasm. The method of testing is extremely delicate and requires much experience, patience and care in order to obtain trustworthy results. In the hands of amateurs it will give conflicting and ridiculous conclusions. It is perhaps due to this fact that there have appeared in the recent literature on this subject so many contradictory statements regarding the efficiency and reliability of this reaction. The technic is as follows:

Half a gram of prepared cancer tissue used for the test is placed in the thimble, which has previously been tested for impermeability to albumin and regular permeability to seidepeptone; 1.5 c.c. of blood serum, absolutely free from hemoglobin, is put into the

thimble and is dialyzed in 20 c.c. of distilled water. The contents of the thimble and external fluids are covered with sufficient toluol to prevent putrefaction and evaporation. The exterior of the thimble is washed with water, which is prevented from entering the thimble by pressing the top together. The thimble is now kept in the incubator for sixteen hours. Then 10 c.c. of the diffusate is removed to a dry test tube and boiled with 0.2 c.c. of a 1 per cent. solution of ninhydrin. A rod to facilitate boiling is inserted in the tube. If, after standing half an hour, the solution remains colorless the test is negative. Controls with the serum alone and with the tissue alone, respectively, are to be employed. In preparing the cancer tissue, the following procedure is adopted: Free the tumor of blood by thoroughly washing it with tap water. Cut the tumor into small pieces, grind these in a mortar, and remove the last drop of blood that may be present. Now boil the cancer tissue for five minutes, adding to the water a drop or two of glacial acetic acid. Repeat this six times, using glacial acetic acid only for the first boiling. Filter 5 c.c. of the water of the last boiling, adding to it 1 c.c. of a 1 per cent. aqueous solution of ninhydrin, and boil for one minute. If the tube remains colorless, preserve the tissue in a well-stoppered bottle, to which enough toluol has been added to prevent putrefaction. The preparation of the cancer tissue must be conducted uninterruptedly and under perfectly aseptic conditions. In order to test for the impermeability of the thimbles to albumin place the thimbles in water for one-half hour. Add to each thimble 2.5 c.c. of a 5 per cent. solution of egg albumin. Wash off well the outside of the thimble and place it in a beaker, into which 20 c.c. of distilled water has been introduced. Cover the contents of the thimble and the surrounding fluid with toluol. Place in the incubator at 37 degrees C. for 16 hours. Remove 10 c.c. of the diffusate. This is now tested for the biuret reaction. If the thimble gives a negative reaction, it is suitable for the test. If the thimbles prove impermeable to albumin, they are next well washed and placed in running water for 12 hours; 2.5 c.c. of a 1 per cent. solution of seidepeptone is added to each thimble, the sides of the thimble being washed off. Toluol is added, and the thimbles are put into beakers, to which 20 c.c. of water have been introduced, and then they are placed in the incubator. After 12 hours 10 c.c. of the diffusate is removed and 0.2 c.c. of a 1 per cent. solution of ninhydrin added. The tube, in which a rod has been placed, is boiled for 1 minute. If a deep violet or a blue color appears after the tubes have stood half an hour, the thimbles are permeable to peptone. The thimbles are now again washed and placed in running water for 12 hours. They are then ready for the test. The technic of the optic method is very simple, but accurate reading requires great skill and experience. Add to 1 c.c. of a hemoglobin-

free serum 1 c.c. of a 5-10 per cent. peptone solution of the organ used. Shake thoroughly, place in the tube of the polariscope and determine the degrees of rotation after it has reached 37 degrees C. If no rotation takes place, no ferments are present.

Wolter applied the Abderhalden reaction to 32 blood sera, 17 of which were from patients suffering with cancer, 6 from normal human beings, and 9 from persons afflicted with various (non-cancerous) affections. He found that nearly 100 per cent. of the known cancer patients gave a positive reaction, while the non-cancerous subjects only 1 in 15 gave a positive reaction. This author regards this test as extremely reliable. Frank and Heimann obtained a positive reaction in 45 of 46 uterine cancer patients, that is, 97.8 per cent., while in 20 normal individuals 95 per cent. were negative. They observed, however, that the serum of pregnant women breaks up cancerous tissue as well. This statement is taken exception to by Wohl, who found that in a pregnant woman who did give a positive reaction with cancer tissue carcinoma was present in addition to the pregnancy. Schiff obtained a negative cancer reaction with the sera of pregnant women (12 cases). Lichtenstein also found that sera from cancer patients did not digest placental tissue. Lampé and Papazolu tested 30 sera from normal healthy individuals against various substances by the Abderhalden dialysis procedure, and they found that normal serum has not the slightest tendency to split thyroid, thymus, liver, pancreas, muscle, adrenal, ovary, testes, placenta or carcinoma tissues. Hermann and Fritsch have recently expressed great confidence in this biologic test for cancer. Lindig found that tumor and pregnancy sera decomposed uterine, ovarian and muscle protein. He found that tumor sera also decomposed placenta. The tumors that he studied were carcinomata, myomata and dermoids. Abderhalden, however, in criticizing Lindig's results, states that the conclusions of Lindig are incorrect, as the organs used were not sufficiently boiled. Abderhalden does not believe that pulverized dried organ can be used satisfactorily for this dialysis procedure. Michaelis also did not obtain good results with the Abderhalden test. In a series of 34 persons tested by Abderhalden the findings were constantly negative in the 7 non-malignant cases and, with 3 exceptions, constantly positive in the cancer cases. The 3 cases of cancer that gave a negative result were far advanced. Though this method is not infallible, still it is of great help in the diagnosis of early cancer. Markus and Münzer reported the application of Abderhalden's technique to 20 pregnant women and 11 cases of carcinoma, and they obtained excellent results. Epstein has examined 47 cases of cancer, and of these 46 reacted positively to the ferment reaction. In all, he examined 110 cases with this method. The findings impress us with the reliability of this early test for malignancy. Brockman,

also, found the test positive in 100 per cent. of 25 cases of undoubted carcinoma, and negative in 20 cases in which carcinoma could be excluded beyond reasonable doubt. According to the observations of Gambarov, the ferments are specific for each variety of malignant tumor; thus sarcomatous ferments will not react to cancer tissue, and vice versa. The material examined by him covered 82 cases, 48 with malignant tumors, 2 with lues, 22 pregnancies and 10 normal sera. With pregnancy and normal sera all results were correct; of 50 tumor cases only one wrong diagnosis was made.

Halpern obtained a positive response to the Abderhalden reaction in 30 of 102 cases of carcinoma, and in 5 of 19 cases of sarcoma. He concludes that this reaction is of doubtful value.

In the early part of 1914, Abderhalden pointed out sources of error that may invalidate his test in the hands of the inexperienced. He also states that the reaction is very delicate and specific.

Piorkowski reported that a process of saponification is a material aid in preparing specimens for biologic tests. The saponification disintegrates the tissue without injuring the antigens.

The von Dungern serologic test for carcinoma is a complement deviation reaction. The first attempt to apply the reaction of complement deviation to cancer was made by Ravenna, to whom the credit should be given. He proved that the serum of a cancer patient possesses the power of binding the complement with the cancer extract. von Dungern made a careful and detailed study of the phenomenon of deviation of the complement. He successively tried as an antigen the watery extract of a cancerous growth, the ethereal extract of the same neoplasm, and then the alcoholic and the acetone extracts. Finally he recommended as an antigen the extract made from human red blood cells. He does not claim that his test is strictly specific for carcinoma; for he obtained positive results with syphilitics and tuberculous individuals using the same method. The test, however, is suggestive in the early stages of cancer. Apparently the antibodies in this reaction are certain products of metabolism which are characteristically present only in cancerous conditions. Several years before von Dungern, Engel (1903) and Mertens (1904) could not prove the existence of specific antibodies (Krebssubstanzen) in the sera of cancer patients. Engel used as antigen saline solution extracts of liver metastases, with no success. Using beef-blood and guinea-pig blood as complement and extractions of mammary or pharyngeal carcinoma or vulvar epithelioma as antigen, von Dungern obtained positive findings in all of 121 cancer patients. Twenty-two healthy controls were negative. Doubtful findings were only obtained in syphilitics who showed a positive Wassermann reaction. von Dungern and Halpern observed that in luetics complement fixation may be present in the cerebrospinal fluid, when the blood is negative. Since

complement fixation may be present in the sera of patients afflicted with a malignant neoplasm, it became important to study the cerebrospinal fluid of such patients to determine whether it is capable of binding complement. As antigen, von Dungern and Halpern used the acetone extract of the red blood corpuscles of a paralytic and also heart extract. Cerebrospinal fluid was used in amounts of 0.4 to 0.05 c.c. Bloody fluids were discarded. The cerebrospinal fluid of 29 patients suffering with various diseases was studied; included in this number were 5 patients with cancer not affecting the central nervous system. The reaction was positive in cases of cancer and negative in all other diseases examined, except lues. By means of the heart extract antigen, it was possible to differentiate the cancerous from the syphilitic fluids, for it was found that the luetic fluid gave positive reactions with both heart extract and blood extract as antigens, while the cancerous fluids were all negative when heart extract was used as antigen, but positive with the blood extract. Lindenschatt found specific differences in carcinomatous and luetic sera by means of the von Dungern sodium hydroxide method. Nearly all cases of cancer reacted positively, whereas luetic sera never caused complement binding. He always used from 0.2 to 0.02 c.c. normal sodium hydroxide, as larger or smaller amounts may interfere with this reaction. Of 50 cases that he examined, 22 were syphilitic, and they never gave a positive reaction. Lindenschatt specifically warns against using sodium hydroxide contaminated with sodium carbonate, and advises following the technic of von Dungern precisely. Tests were made by Barratt with sera of 6 cancer patients, using as antigen in each case an extract of the corresponding tumor. In 2 cases the hemolysis was less than with normal serum; in the rest the resulting reaction did not differ greatly from that with normal serum.

Rosenberg and Wolfsohn, while disclaiming any specificity for this reaction, still recognize some value in this method of examination. Schenk and Edzard, on the other hand, cannot find anything encouraging in this reaction. Still Halpern, working in von Dungern's laboratory, has examined 300 sera of various individuals. Of the 300 cases, 177 had definite diagnoses: 79 were carcinoma, 42 other tumors, and 56 were not tumor patients. Of the 79 cancer cases, 71 gave a positive reaction (89.8 per cent.). The sera of the 56 non-tumor patients were negative in 52 cases (92.8 per cent.).

Several authors have found some relationship between the Wassermann reaction and carcinoma. It seems to me that that was due to some error in technic, etc. Foerster found that it was possible to prepare an antigen extract for the Wassermann reaction from purely cancerous material. Newmark reported two positive Wassermann reactions in cancer patients in whom he was certain there was no luetic infection. Lassen stated that there could be no ques-

tion of syphilis in the case which he reported, but yet the Wassermann reaction was strongly positive. He cites the few cases on record of a positive reaction with cancer in the absence of syphilis, remarking that with improved technic the number is growing constantly smaller. Fox found that cancerous individuals gave very rarely a positive Wassermann reaction.

The epiphanin reaction cannot be made use of in carcinoma. It has proved unsuccessful in the hands of various workers.

The antitrypsin reaction is another serologic test for carcinoma. It was first described by Brieger and Trebing. When blood is allowed to remain on a Löffler serum plate, the serum is readily digested, due, it is thought by Jochmann and Müller, to a ferment inherent in the polynuclear neutrophiles. That this was true, and that the lymphocytes do not contain this digestive ferment was later proved by Müller in his work on pneumococcic sputum. This digestion, it was soon found, could be brought to a standstill by adding normal serum to the leukocytic suspension, thereby proving the existence of an antiferment in normal blood serum.

Brieger and Trebing have demonstrated in 1908 that in carcinoma and in all other diseases associated with a destruction of leukocytes, the antitrypsin contents of the blood were increased. Brieger has termed this phenomenon "cachexia reaction," since he has observed it in many diseases which are associated with the cachectic state.

Antitrypsin was shown by Jürgensen to be a very resistant substance, remaining unchanged in strength when kept for 40 days at room temperature in the daylight or in the dark; putrefaction does not materially affect it. The union of trypsin and antitrypsin is not broken by the addition of considerable amounts of sodium hydroxide or hydrochloric acid. Antitrypsin resists heating at 58 degrees C. for one-half hour; at 65 degrees it is completely destroyed. All the antitrypsin in the serum is in the albumin fraction, none being found in the globulin portion. Meyer, after careful consideration of the disputed points concerning the antitrypsin of blood, concluded that it is thermolabile, non-diffusible, and is insoluble in the fat solvents. It is precipitated by ammonium sulphate, chiefly in the albumin fraction, but it may be also found in the globulin fraction. According to him, antitrypsin is a colloid protein and not a lipid. The pathological increase of antitrypsin is probably due to the intracellular tryptases rather than to the tryptases of the pancreas and leukocytes.

The original technic for the test of the action of the proteolytic ferments was with a Löffler plate, to which loopfuls of the solution of the ferment were transferred. Kantorowicz has improved on this by using sheets of gelatin instead of the plate; the gelatin sheets keep indefinitely, and the record is thus permanent. He uses fine

gelatin, such as is suitable for culture media, dissolving 6 gm. in 100 c.c. of physiologic salt solution stained deep red with fuchsin and rendered sterile by addition of 0.5 gm. of phenol. He pours 10 c.c. into rectangular shallow dishes. They can be made out of old photograph plates by running a strip of gelatin around the edge to form a wall, pouring the gelatin inside this wall as it hardens. The normal serum digests a circular patch of the gelatin; the presence of the antitrypsin ferment is shown by the smallness of the resulting hole. After 24 hours at 22 degrees C., a little lake is seen where each drop has been deposited. The sheet of gelatine is then rinsed in water and the holes in the gelatine look as if punched out with a circular punch, as he shows by two illustrations. The hard sheets of gelatine can be kept indefinitely.

Mandelbaum, Mintz and others have also modified this test.

Waelli examined 120 patients, many of whom were cachectic, by means of this reaction. Of these, some reacted positively, while others did not. A case of cancer of the breast was negative, while, on the other hand, a case of coxitis was positive. Bergmann, Jochmann, Ruge and Meier do not believe in the cachectic theory. They have shown that starving dogs never had a high antitryptic index. Klug also found a decrease of the antitrypsin content in a case of marasmus. It was believed that the antiferment was in some way associated with destruction of leukocytes, but Waelli thinks there is some intermediary metabolism which leads to its formation. He believes that this metabolite is in the nature of an antiferment called into existence by a ferment which arises in the organs or in an organ. There may be two sources of the proteolytic ferment: (1) leukocytes, (2) parenchyma of pancreas and thyroid and, perhaps, neoplasms; but no matter where or how formed, antitrypsin is always produced (antitryptase).

The most obvious question is whether there is an increase in the antitryptase in carcinoma. From Waelli's tables we can judge the value of the antitrypsin index in carcinoma:

	Cancer	Tubercul.	Struma	Graves' Disease	Infectious Diseases	Miscellaneous
Total.....	47	19	21	12	8	13
Positive....	44	17	15	12	6	4
Per cent....	93.6	89.5	76.1	100	75	30.7

According to Waelli, the only advantage in this reaction is to diagnose a malignant from a benign neoplasm. He supposes that a benign neoplasm would give a negative reaction, while a cancer would show a high antitryptic coefficient.*

Roux and Savignac investigated 125 cases with this reaction, and

*Cited after Goodman: *Progressive Medicine*, 1913, xv, pt. 4, 44-45.

they believe that a normal antitrypsin index excludes cancer. Though they confess that this test is not specific for cancer, still they attach very much importance to it, and are very enthusiastic in recommending it. They used the milk casein technic.

Pinkuss, in 1912, reviewed the literature on the Brieger-Trebing antitrypsin test. In his hands the reaction gave very good results, and with carcinoma cases he obtained a very high index of antitrypsin. Of 98 cases of cancer that he examined only 8 failed to respond to this test. Heide and Krösing, in their communication in a gynecological journal, stated that 80-90 per cent. cancer patients responded positively to the Brieger test. Fränkel also is convinced of the reliability of this reaction. Shaw-Mackenzie believes that it has been proved that the serum of the blood taken from cases of carcinoma manifests two important properties: (1) Increased antitryptic value, (2) a power to accelerate the action of pancreatic lipase which is far in excess of what is found in normal serum. These two reactions, when present together, furnish a valuable aid in the diagnosis of malignant disease, and their absence excludes a diagnosis of cancer. After recovery or improvement, or during a period of quiescence, the accelerating power of the serum on lipase remains high, or may be even higher than when the disease is manifest. But under the same conditions the antitryptic value falls to normal. Such reactions serve, therefore, according to this author, to control the treatment and to indicate the progress toward recovery or otherwise. The lipoclastic acceleration is a possible and natural factor in resistance to disease, in carcinoma and in other conditions. If this suggestion is admitted, serum and substances which increase this action or protective mechanism are indicated in treatment.

Citronblatt reports positive findings with the antitrypsin test in 90 per cent. of 99 cancer patients, in 2 typhoid and in 2 gallstone cases; negative in the numerous controls. Sarcomata seldom cause increase in antitrypsin, and the sera of rabbits subjected to inanition remain unchanged as compared with normal animals. According to Citronblatt, the best method for determination of antitrypsin is that of Marcus with Löffler plates. In his dissertation, Couturier reported that the antitryptic index of the blood serum is increased in patients afflicted with carcinoma.

For the determination of the Brieger index, Viotor used milk-thymol-agar plates (Eijkman) prepared in the following way: One liter of distilled water is allowed to stand 24 hours with 2 grams powdered thymol. It is then thoroughly shaken and filtered. A 2-3 per cent. alkaline agar-agar is prepared with this water; 10 c.c. of this liquid agar is mixed with 4 c.c. milk (sterilized at 110 degrees C.) in a Petri dish. The advantages of this method are: (1) Bacteria do not grow on this medium, and experiments can be car-

ried out at 37 degrees C.; (2) they are of constant temperature; (3) the reaction is more delicate than when using the Löffler plate or the method of Gross-Fuld.

Deleuze has great confidence in both the antitrypsin test and the meiotagmin reaction, and he recommends that they be used simultaneously when testing for cancer.

Isaja found a more or less pronounced tryptic action in 4 out of 6 cases of neoplasm. The two negative cases were a sarcoma of the forearm and a fibromyoma of the uterus. The antitryptic power of the serum of a dog was increased from 1:1 to 1:2 by injection of an extract of cancerous mammary gland, while the extract of the normal gland had no effect. An increase in the antitryptic power of the dog serum was observed after repeated subcutaneous injection of trypsin. The antitryptic power of the serum was increased from 1:3 to 1:8 in mice in which tumor tissue had been implanted.

Using the Kämmerer technic, which they recommend in preference to others, von Graff and Zubrzycki reported that the antitrypsin content of the serum shows a constant increase in carcinoma, and may, therefore, be considered of diagnostic significance. They found that the antitrypsin index decreased after radical operation and again increased after recurrence.

Boekelmann and Simons found that there is no relation between the amount of antitrypsin and the leukocyte count. In cancer they observed a great increase of the antitrypsin index, independent of cachexia. The trypsin-antitrypsin reaction exhibits the Danyz phenomenon. Sodium hydroxide inhibits the reaction, not through destruction of the antitrypsin, but through a temporary inactivation, which can be overcome by hydrochloric acid.

According to Katzenbogen, patients in whom there is a destruction of leukocytes have a high antitryptic index, independent of the cause of the disease. He also found that malignant growths give a high content, while in the cases of benign growth the content is nearly normal. He states that a high antitrypsin coefficient is not pathognomonic of cancer, but a nearly normal index makes it highly improbable that a malignant growth exists.

By making use of the anaphylactic reaction, Ransohoff hoped to procure a means for the early diagnosis of cancer. Normal individuals or individuals suffering from a different disease than cancer do not, according to this author, react to his method. His test is performed in the following way: Two series of guinea pigs are used in each test. Pigs of series A are sensitized with normal blood serum in doses from 0.01 to 0.5 c.c. Series B are sensitized with serum from a known advanced case of cancer. After 2 weeks each pig of both series are given an intraperitoneal injection of 5 c.c. of blood serum from a cancer-suspect individual. Series A show a

mild reaction; series B show a very severe reaction, if the result is positive.

The meiotagmin^{*} reaction of Ascoli and the hemolytic test of Kelling may next be considered.

Kelling found that in 66 per cent. of patients suffering from malignant growths of the digestive tract the serum produced a considerably stronger and more rapid hemolytic effect on the red blood corpuscles of hens than the serum of patients with other diseases, or than the serum of healthy subjects. With his test he was able, in many cases in which no tumor could be felt, to make a correct diagnosis, as was demonstrated by later operation. Kelling designated his tests as IIa, IIb and III. The IIa test determines the amount of hemolytic ferment in the serum, which is increased in malignant tumors. The IIb test shows the existence, according to Kelling, of a specific immunizing body combined with the red blood corpuscles of the hen. The III test shows that a certain amount of the specific immunizing body becomes, through inactivation for the red blood corpuscles of the hen, incapable of combination. Brügemann employed Kelling's test on the sera of 159 patients, and on the sera of 16 pregnant women. He found that the tests IIa and IIb were not useful for the diagnosis of malignant tumors in general. In malignant gastric tumors, in the diagnosis of which Kelling especially advised his test, the results were strikingly more frequently positive (68 per cent. of the cases) than with other diseases (7 per cent.). This high percentage of positive reactions in malignant gastric tumors is particularly due, in Brügemann's opinion, to the fact that marked destruction of the cancer, as it is seen in the stomach and intestines, as well as in the ulcerated cancers of the mammae and uterus, causes a marked hemolytic effect in contrast to non-ulcerated tumors. A markedly positive result with test IIa in the case of an abdominal tumor, taken with the other symptoms, supports, according to Brügemann, the diagnosis that the tumor is in the gastrointestinal canal or has invaded the canal. The test III gave irregular results, although the number of cases investigated are admitted to be small. In a part of the positive results with the tests IIa and IIb, the weak reactions were probably due to the increased quantity of the normally occurring non-specific hemolysins; in another part of the cases to the destructive products of the malignant tumors, which cause a strong hemolysis.

Ascoli originated the meiotagmin reaction in 1910. The word meiotagmin signifies a small drop: *μείων* small; *σπασω* drop. The test is based upon the fact that when the antigen of the tumor and the antibody of the serum meet there will be a reduction in the surface tension of the serum, and the drops will become smaller. In order to carry out this reaction, resort must be had to Traube's stalagmometer. The method of procedure is as

follows: The cancer tissue is extracted for 24 hours with methyl alcohol at 50 degrees C., with occasional shaking. The extract is then filtered hot, cooled and refiltered. The antigen is prepared by adding one cubic centimeter of a 0.01-0.02 per cent. water emulsion to 9 c.c. of the serum and diluting twenty times with 0.85 per cent. sodium chloride solution. The determinations are made by means of Traube's stalagmometer. Extreme accuracy is needed and much experience is required in order to be in position to draw trustworthy conclusions by means of this test.

Izar, in 1911, found that the serum of rats with transplantable sarcoma and the serum of human cancer patients react positively to the meiostagmin test. The serums of rats which do not yield tumors upon inoculation he found to be negative to this test. Subcutaneous implantation of pieces of transplantable rat sarcoma in guinea-pigs causes the development of specific tumor meiostagmins. He also tested (as reported in a later communication) the meiostagmin reaction with tumor antigen and sera from cases of various malignant tumors, and of nephritis, pneumonia, pleuritis and tuberculosis. Only the cancer sera gave the reaction, according to Izar; the usual increase in the drop number is *three*. Serum allowed to settle at 37 degrees C. is most effective, while serum centrifugalized at room temperature, citrated plasma and laked blood are less effective. Sodium chloride and calcium chloride up to a concentration of 1 per cent. favor the reaction, whereas a concentration over 4 per cent. inhibits it. Slight amounts of 0.1 per cent. acetic acid favor the reaction, greater concentrations inhibit it; sodium hydroxide shows a similar but slighter effect. He found that sera preserved with 0.4 per cent. phenol react even better than when fresh.

While not denying that the Ascoli reaction has clinical value, Brügemann states that it is not specific for malignant tumors. Ranzi examined 234 cases of carcinoma by the meiostagmin method, and he found that 209 cases (89 per cent.) gave a positive reaction. On the contrary, of 233 normal cases only 3 reacted positively. From this we can conclude that Ranzi is a firm supporter of this test. The Italian physicians are very sanguine in the confidence which they place in the meiostagmin test. Lately, also, the German observers have written in commendation of this laboratory method. Stämmeler has employed it in 350 cases. Though he finds that it is not specific for cancer, still he believes that it is of aid especially in diagnosing the return of the disease after operation. He suggests a new method for cancer diagnosis: If an extract is made of cancer tissue it will be found to be opalescent. This opalescent extract will be clarified when cancer serum is added to it. In a series of 249 cases thus tested, he found that, of the 100 cancer cases of this series, 83 reacted positively.

Julchièro found that the meiostagmin reaction is positive during most cases of pregnancy, but the values do not reach such high figures as those which are obtained with true cases of malignant neoplasm. In comparing the *in vitro* and *in vivo* methods of this test, Izar concluded that the former is more reliable when a positive test is obtained.

Izar has prepared a synthetic antigen for the meiostagmin reaction. The solution of pancreas antigen in methyl alcohol (used in this reaction) was purified by successive precipitation with acetone, ethyl alcohol, ether, benzol and petroleum-ether. The purified product was no more stable than the crude antigen, and was inactive when used as the cadmium, silver or platinum salts. After purification, the antigen was soluble in acetone, although previously it was insoluble. As artificial antigens, Izar prepared the following: Myristil peptone (Witte), myristil albumose (from Witte peptone and from peptic and tryptic digestion of calf pancreas), myristil-edenin, -elastin, -casein, and -kyrin. Fatty acids were also used. Complement fixation took place equally well with the purified and artificial antigens.

Rosenberg used in his tests the synthetic antigens of Izar, and in place of Traube's stalagmometer he used the viscostagonometer of Traube. Using the myristil protein of 20 clinically positive carcinomata, 18 reacted positively; of 3 doubtful cancer cases, 1 was positive. With the myristilic acid-gelatine emulsion of 24 clinically positive carcinomas, 21 reacted positively; and of 8 questionable cancer cases, 3 reacted positively. Of 15 other diseases examined, all were negative. Using the ricinol-linoleic acid, 12 clinically definite carcinomas gave in 11 cases a positive reaction; 4 clinically questionable cases gave a plus reaction in 1 instance; of 20 other diseases, 2 reacted positively. In the above examinations, 36 of the 44 non-cancer cases gave a positive Wassermann reaction. It was noted especially that liver cirrhosis, pneumonia, severe tuberculosis and advanced diabetes may react positively, as may also the sera of gravid women. On the other hand, skin carcinoma and advanced cancer with marked cachexia may yield a negative meiostagmin reaction.

Koehler and Luger found that the lecithine acetone extract gives a smaller number of faulty diagnoses than the other antigens in the meiostagmin reaction, and is more permanent. They found that saponin hemolysis is accelerated by the presence of tumor serum and antigen. Zarzycki also found that the lecithine acetone extract does not completely remove all the antigen contained in pancreas or cancer tissue, but he asserts that the permanency and easy preparation of the extract render it of great value practically.

Micheli and Cattorette have performed experiments on the influence of narcosis on the meiostagmin reaction, and they showed

that chloroform narcosis does not materially affect the surface tension of blood serum in dilution of 1:20. There is, however, always a change in the reactivity of the serums as regard the antigens (pancreas and tumor extracts) usually employed for the meiotagmin reaction in the case of malignant tumors. Sera which at first reacted negatively gave positive reactions after narcosis, while the intensity of the reaction was increased in the case of positively reacting sera. In view of the lipoid nature of the meiotagmin extract and also of the fact that similar results were obtained with both specific and non-specific antigens, the authors concluded that a positive meiotagmin reaction is the expression of an increase in concentration of the lipoids of blood serum. The meiotagmin reaction is, therefore, a sensitive indicator of the lipoid metabolism, and, with certain restrictions, is of clinical diagnostic value.

Let us again return to Kelling's hemolysis reaction. This author attributed great importance to the manifestation of hemolysis in the blood sera of cancer patients. Kelling regards cancerous conditions as a parasitic, heterolytic, embryonal growth, which induces hemolysis of the red blood cells. This hypothesis was denied by Lazarus-Barlow, Douglas, Santini, Engel, Martens, Kullmann, Bernbach and Serafini-Diez. The diagnostic value of the Kelling's heterolytic reaction is disputed by von Dungern, and is corroborated by Pans, Widerose, Rosenbaum and Fischel. The technic described by Kelling is as follows: 15 grams of blood are drawn. The blood must not be more than 36 hours old. To 0.1 c.c. of the serum 1 c.c. of a 5 per cent. suspension of hen's corpuscles in a normal saline solution is added. The test tube is well shaken and placed in a water-bath and incubated at 37 degrees C. Control tests are also made. Kelling has applied his reaction to 1,500 persons, including 400 carcinoma cases. He assures us that this method is very reliable for the early diagnosis of cancer.

Freund and Kaminer have recommended a cytolytic test for cancer. The power of normal serum to destroy tumor cells depends on a nitrogen-free fatty acid which is soluble in ether. The serum of cancer subjects has the power to protect the tumor cells from being destroyed by normal serum, and gives cloudy precipitates with sodium chloride extracts of the tumors. This property could be referred to that portion of the nucleoglobulin characterized by a larger percentage of carbohydrate than is present in normal nucleoglobulin. Cells of carcinoma and sarcoma were found to exert a different power of selection as regards carbohydrates and proteins. Cancer cells unite particularly with sugar, lecithin and nuclein, so that the growth of tumor cells depends on the presence or absence of these substances. During the precipitate formation, upon addition of sugar and peptone, the precipitates exert a similar power of se-

lection, the carcinoma precipitates uniting with the sugar, the sarcoma precipitate with the peptone.

Monakow does not hold the Freund-Kaminer theory, still he points out that its main value is that it indicates the presence of some protecting ferment in the normal blood serum which is absent in the serum of individuals suffering from cancer. Ranzi and Amidrazibi examined 7 cancer patients by the Freund-Kaminer method. Five of them (71 per cent.) reacted positively. Krauss, von Graff and Ranzi examined 28 cancer cases, and they also found that 71 per cent. (20 cases) gave a plus reaction.

The method of procedure of the Freund-Kaminer test is as follows: Cancer tissue is preferably chosen from the metastatic nodules present in the liver of a subject who had died from carcinoma. These nodules are washed in water and then allowed to soak in a 1 per cent. solution of monosodic phosphate. The nodules are then cut with a sharp knife into small pieces and are pressed in a pressing machine. The cells are then washed three times with physiological saline solution and centrifuged. They are then set aside until needed in a 1 per cent. solution of sodium fluoride. In order to perform the test, take 1 c.c. of serum to be tested, 0.1 c.c. of the 1 per cent. sodium fluoride suspension and a few drops of a 1 per cent. sodium fluoride solution. The cells are now counted and are then placed in an incubator for 24 hours, after which time the cells are again counted. A positive reaction is the one in which the second cell count will reveal absence or marked diminution in the number of the cells.

In 1908, Simon and Thomas reported that cancer serum will autolyze cancer cells. They proceeded in the following manner: The tumor material removed at operation was brought to the laboratory as soon as possible, and an emulsion of the most cellular portion was made in saline or Ringer's solution, as also in the patient's and normal blood serum. Breast cancer was utilized almost exclusively, as tumors from other sources were usually so extensively infected with bacteria that they were entirely unfit for this purpose. The emulsions were drawn up into Wright capillaries, sealed and incubated for 24, 48, or 72 hours. Smears were then made on cover glasses, hardened in alcohol and stained over night in Giemsa solution. The saline and Ringer emulsions invariably showed complete destruction of the cells; and it is noteworthy that this will also take place after a much shorter incubation. In several instances marked destruction was observed after several minutes contact. In normal blood serum, on the other hand, the cells remain well preserved.

Quite a number of investigators have reported other various hemolytic tests for malignancy. In cancer, according to Goldberger, the resistance of the erythrocytes to hemolysis by lactic and oleic

acids is reduced, but this reduction is not specific; for the corpuscles of tuberculous patients show the same property. The antihemolytic property of the serum is increased in carcinoma, which seems characteristic of malignancy. Sweek and Fleisher, in contrast to the results of Goldberger, could find no increase in the antihemolytic effect of the serum of cancerous patients upon the action of lactic and oleic acids on sheep corpuscles. The antihemolytic activity of the sera of normal individuals varies within rather wide limits.

Crile tested blood serum of cancer patients against suspensions of normal red blood cells. He found that normal individuals gave no hemolytic reactions, whereas cancer patients produced hemolysis in 85 per cent. of the cases. Alessandrini examined a large number of sera, especially of cancer subjects, for the presence of isolysins by the Crile method. Hemolysis was absent in cases of sarcoma and non-malignant tumors; it appeared very rarely in cases of surgical tuberculosis or in other diseases. In 53 cases of cancer it appeared 25 times. After the exclusion of advanced or even superficial tumors it was observed in 20 out of 22 cases. After extirpation of the tumor the reaction gradually disappeared. In one case it reappeared in four and one-half months, and there was found to be a cancer rest remaining.

Fischel found that in about one-half of the cases of malignant tumors the blood serum had an increased hemolytic power as compared with normal serum. In his tests he used hen's red blood cells. He reported that diabetes mellitus, pernicious anemia, tuberculosis and endocarditis also gave positive reactions. Weil repeated Fischel's experiments, using human red blood cells, and he corroborated Fischel's findings. Weil stated that the reaction is not at all specific for cancer. In various diseases human serum is occasionally hemolytic toward the corpuscles of other human individuals. He found that extracts of lymphosarcoma of dogs were not hemolytic for dogs' red blood cells, but necrotic tumors showed high hemolytic power. The blood serum of most individuals suffering from malignant neoplasm contains, according to Piccinini, hemolytic substances which can be demonstrated by a special technic. This occurs most frequently in carcinoma of the internal organs, while hemolytic activity is usually lacking in cutaneous epithelioma. Cancer hemolysins are thermolabile and react without addition of complement. The occurrence of hemolytic substances may have diagnostic and prognostic value in indicating whether previous excision has been successful. In tuberculous cachexia, the hemolytic reaction seldom occurs, while hemolysins are entirely lacking in cases of sarcoma, non-malignant tumors, etc.

Von Graff and Zubrzycki found that carcinomatous sera activate the cobra-venom-horse-blood corpuscle hemolysis in over 70 per cent. of the cases, while normal sera and other abnormal sera only

activate in about 10 per cent. of the cases. The reaction is not diagnostic of carcinoma, because the sera, from women operated on for carcinoma and residue-free, are strongly activating.

It was shown by Greenbaum and Greenbaum that successful inoculation with sarcoma was antagonistic to successful immunization with cobra-venom. In an effort to discover the cause of this incompatibility, the auxiliary action on venom-hemolysis of the inactivated serum of susceptible and refractory animals was determined. The serum from positive animals (with well-grown tumors) gave a quick and complete hemolysis; that from negative animals (refractory) gave a slow and incomplete hemolysis.

Fränkel reported that of cancer patients 73.4 per cent. showed a positive hemolytic reaction while of non-cancerous conditions 44.4 per cent. reacted positively. This, of course, would render the test extremely unreliable. Ottenberg and Epstein obtained almost identical results. They found that the serum of malignant new growths gave a positive hemolytic reaction in 76 per cent., whereas normal serum reacted positively in 50 per cent. of the cases.

Keith and Keith are of the opinion that death from cancer, when there is no complication, is due to the poverty and destruction of the erythrocytes, and to the actual and relative increase of the polymorphonuclears at the expense of the life-giving lymphocytes.

Elsberg, Neuhoof and Geist recommended a skin reaction for carcinoma. Upon injection of washed red blood corpuscles under the skin of cancerous subjects, an inflammation reaction sets in at the site of the injection. Warfield investigated the claims of the above authors, and he came to the conclusion that the test is not of sufficient reliability to have much value. Gorham and Lisser compared this skin reaction with the hemolytic power *in vitro* of the serum of cancer patients in order to study the relation, if any, existing between these phenomena and the normal isohemolysins and isoagglutinins. As the result of their studies, the authors reach the conclusion that the test is certainly not specific for carcinoma. They found it positive in somewhat more than half of the patients suffering from cancer (60 per cent.) and negative in a large majority of the patients showing other forms of disease (89 per cent.). According to them, it may prove to be another help in the diagnosis of cancer, and its value is sufficient to warrant the application of the test for study in a large number of cases. Apparently no connection exists between a positive skin reaction and hemolysis in the test tube.

Lisser and Bloomfield obtained positive results with the method of Elsberg, Neuhoof and Geist in 66.6 per cent. of 62 cases of cancer. In 94 control cases, 91.6 per cent. were negative, and 8.4 per cent. positive. They conclude that, as a practical diagnostic adjunct, a negative skin test adds no weight to the evidence against

cancer, but a positive reaction is strong presumptive evidence of cancer.

Carcinoma of the gastrointestinal tract has been studied more thoroughly than cancerous growths of other parts of the body. Many attempts have been made to develop a test to be applied to the gastric contents that will reveal at an early stage of the disease the presence of a malignant neoplasm. We cannot say that there is any pathognomonic sign of cancer. However, a conjunction of the various laboratory methods may in the near future yield us reliable and accurate results.

"The macroscopic evidence in the stomach contents show chiefly poor protein digestion, while the carbohydrates have been well acted upon. Tumor fragments are very rarely seen; blood is common, and sometimes there is pus." Heyrovski reports the histologic findings in 120 cases of gastric ulcer and in 28 cases of gastric cancer, and states that he was able to ascertain the present health of 43 patients given operative treatment for gastric ulcer.

There is usually a progressive and gradual diminution of the free hydrochloric acid until it is absent and the ferment also disappears in part or entirely. This occurs, according to Stockton, in 80 to 90 per cent. of the cases. However, the presence of hydrochloric acid is no proof of the absence of cancer of the stomach. One should never draw conclusions from one examination. In all cases it is advisable to make repeated tests. It is the persistent lessening or the absence of free acid which is suggestive.

Glutzinski by means of test meals has recommended a method to diagnose cancer of the stomach. By his method three tests are made on the patient in one day. The first test is on an empty stomach; the second after an albumin meal (consisting of two hard-boiled egg-whites and 100 or 200 c.c. water); and the third test is made after a test dinner. One should find hydrochloric acid in two out of the three tests if cancer is present. The theory of this test is based on the fact that as a result of acid catarrh a chronic mucous gastritis occurs. Such a condition can supervene either as a result of the healing of an ulcer without the formation of a stenosis or when an ulcer becomes cancerous. If one gets a weakened reaction at the first test, and at the other two a marked reaction, it implies the commencing change from acid catarrh to gastritis. In ulcer we find hydrochloric acid in each test. If, however, cancer is developing on the ulcer, we have progressive secretory insufficiency.

Rusca does not believe in the reliability of the Glutzinski test meal diagnosis. According to him, there are too many factors that play an important part in determining the amount of free hydrochloric acid. Nevertheless, Nicolayessen, of Christiania, reported before the International Congress of Surgeons, New York, 1914,

that he and his collaborators have obtained good results with this method. Kuttner, on the other hand, does not believe that Glutzniski's claims can be substantiated.

According to Emerson, certain basic substances are produced by autolytic processes, which unite with the free hydrochloric acid and thus diminish the amount present. These substances he found to be hexone bases.

Ziegler, Sailer and Stockton have reported cases of hyperacidity with cancer of the stomach occurring in the early part of the disease. Ziegler distinguishes three stages of hyperacidity in purely cancerous conditions of the stomach: (1) Uncomplicated hyperacidity in old people, formerly well; (2) hyperacidity, but no lactic acid and no bacilli, like the condition in simple ulcer or in mere hyperchlorhydria, but treatment is of no avail; (3) gastric analysis shows normal hydrochloric acid or a subacidity, with some mucous and some motor insufficiency, accompanying a declining health.

Graham says that definite variations in the amount of active acid and mineral chlorides present in the gastric juice are caused by carcinoma of the stomach. The increase in the mineral chlorides may be an earlier sign of carcinoma than the diminution of the active acid. These changes can be observed in the great majority of cases. This condition can be accounted for by the secretion of an alkaline fluid in the stomach, which neutralizes the acid. The alkaline fluid is most probably secreted by a malignant growth, which has begun to ulcerate. In carcinoma the total chlorides are decreased, but the active acids are much more decreased, while, as has been said before, the mineral chlorides are increased.

Fujinami expressed the opinion that if the stomach continues to secrete juice, even in the fasting condition, cancer is to be suspected.

Graham and Guthrie analyzed the gastric contents of 150 patients suffering with carcinoma ventriculi. They obtained the following results, which I shall present in the form of a table:

Free hydrochloric acid present in.....	70 cases
Free hydrochloric acid (no blood, lactic acid, food) in..	46 "
Blood present in.....	80 "
Blood and lactic acid present in.....	20 "
Blood and food present in.....	15 "
Blood and food and lactic acid present in.....	30 "
Food remnants present in.....	62 "
Lactic acid present in.....	64 "

The presence of lactic acid depends mainly on diminished motor power and lessened hydrochloric acid. It is usually absent when free hydrochloric acid is present. However, it may be introduced into the stomach by means of bread, milk, fish, meat, etc. Boas

has, therefore, recommended that a test meal of oatmeal and water be used. The early appearance of lactic acid in cancer of the stomach, together with a diminution of total acidity, is very significant. Boas shows from combined statistics that 84.4 per cent. of all gastric diseases in which lactic acid is found are cancerous, and Schiff's statistics show that 73.5 per cent. of gastric cancers give positive tests for lactic acid. Kuttner and Linder say that lactic acid does not appear before a tumor is felt, but, according to Stockton, this is too general a statement.

Of the other organic acids that may be present, butyric and acetic are the ones more frequently found. von Graff has recently reported that oleic acid is present in the gastric contents of cancer patients. In our laboratory we (Kahn and Subkis) have found that we could not obtain von Graff's results. We endeavored to find the presence of oleic acid by means of Hübl's iodine number, and our results show that gastric contents (cancerous and non-cancerous) that contain little acid yield a very low Hübl number, whereas in other cases where the acidity was quite distinct (the disease non-cancerous) we obtained a relatively large iodine number. It is in place to state here that the Hübl number is not specific for oleic acid, but will be given by any unsaturated organic compound that may be present.

According to Salomon, carcinoma of the stomach always secretes a certain amount of albuminous serum. He consequently interprets the presence of a fluid rich in albumin as significant of the existence of carcinoma. Based upon this theory, he recommends the following test, known as the Salomon test for gastric cancer:

This method consists of giving the patient a light breakfast and dinner and then washing out the stomach in the evening until the washwater is perfectly clear. On the next morning 400 c.c. of physiological saline solution are poured into the stomach and then withdrawn. This is repeated several times with the same 400 c.c.

In this washwater, nitrogen is determined by means of the Kjeldahl method, and albumin by means of the Esbach method.

Salomon found the nitrogen content in non-carcinomatous cases to be between 0 and 16 mgs. per 100 c.c. fluid. His study of 6 cases of cancer of the stomach revealed between 10 and 70 mgs. of nitrogen per 100 c.c., and the albumin content was between 0.06 and 0.5 parts per thousand. According to Salomon, a case is extremely suspicious of carcinoma if the nitrogen content is more than 20 mgs. per 100 c.c., or if the Esbach test gives a distinct precipitate. Wolff and Junghans used the Tsuchiya reagent instead of the Esbach reagent for determining the amount of albumin in gastric contents. No doubt the latter authors have obtained more accurate results than those who have used the Esbach method. We (Kahn and Silberman) have found that the Tsuchiya reagent gives larger re-

sults than the Esbach solution; but we would recommend that, instead of either solution, the method of Pfeiffer or of Claudius be adopted for albumin determinations. Smithies found that the Wolff-Junghans modification is of decided value.

Siegel concurred with Salomon's opinion, concluding from his his own results that a figure over 25 mgs. nitrogen per 100 c.c. is suspicious of gastric cancer. Orlowski, Schittenhelm and Lowes, Zirkelbach, Witte and Schupfer are convinced that the Salomon test is of value. Zirkelbach, however, is of the opinion that the minimum nitrogen content suggestive of cancer is 30 mgs. nitrogen per 100 c.c. Reichenstein takes issue with Salomon, and states that the high nitrogen content is due to retention of food particles which have not been washed out when the patient was prepared for the test. Berent and Guttmann, Romano, and Yague are convinced that the test is of no value. Goodman modified the Salomon test by analyzing the gastric contents for phosphorus. He concludes on the basis of his findings that: (1) In normal individuals and in persons suffering from diseases exclusive of carcinoma of the stomach, the Salomon test occasionally gives more than 20 mgs. of nitrogen per 100 c.c. of washwater; (2) not all cases of gastric carcinoma reveal more than 20 mgs. of nitrogen—the absence of ulceration is probably responsible for this; (3) the test is by no means pathognomonic and can be considered as contributory only to the other symptoms; (4) the phosphoric acid of the washwater of a non-carcinomatous case is less than 10 mgs. per 100 c.c., whereas in cancerous conditions it usually exceeds 10 mgs.

Salomon and Falk have suggested another method for the laboratory diagnosis of cancer. This is called the salicylate test. The stomach is washed out, after which a rectal enema containing 3 gms. sodium salicylate is given. As soon as the sodium salicylate can be detected in the urine, the stomach is again washed out, and the washings tested for salicylate. Healthy individuals will not contain any salicylate in the washings, while cancerous persons will.

Mironescu proposed a test which he had always found serviceable in the differential diagnosis of carcinoma of the stomach from other conditions associated with the absence of hydrochloric acid. It consists merely in the administration of 20 drops of the tincture of cinchona before a test breakfast. Mironescu has found that in the gastric disorders other than carcinoma, characterized by an absence of hydrochloric acid, and especially in the functional disorders, when a test breakfast is *preceded* by the tincture of cinchona, hydrochloric acid appears in greater or less quantity. The same, however, does not occur when the anacidity is due to carcinoma.

(To be concluded)

Progress of Diagnosis and Prognosis

GENERAL METHODS OF EXAMINATION—SYSTEMIC AFFECTIONS—DISORDERS OF GENERAL METABOLISM

Organic Acids in the Urine of Nurslings—H. ARON and M. FRANZ, *Monatsschr. f. Kinderheilkunde*, Vol. XII, No. 11, 1914.

The nursling excretes but very small amounts of volatile fatty acids in the urine. An increase of the amount of these fatty acids is not noticeable when a diet rich in fat substances is taken. In acute nutritive disturbances, like dyspepsia and intoxication, the amount of the urinary fatty acids is certainly not increased. The urine of nurslings contains nearly always oxalic acid even when the diet (mother's milk, cow's milk or cow's milk and sugar) is free from oxalic acid. The latter is either formed in the intestine as a fermentative by-product, or during the intermediary metabolism. After administration of saccharose or a mixture of dextrin-maltose the urinary oxalic acid appears somewhat higher than when milk alone is ingested. Addition of flour markedly increases the oxalic acid excretion. MILL.

Coagulability of the Blood in the First Weeks of Life—E. FLUSSER, *Monatsschr. f. Kinderheilkunde*, Vol. XII, No. 12, 1914.

The coagulation time, i.e. the period until the production of the first clotting in the healthy nursling, during the second week of life, is on the average $8\frac{3}{4}$ minutes at an external temperature of 19 to 20 deg. There are no important changes in digestive disturbances, dyspeptic erythema, eczema, pemphigus neonatorum, early rachitis, cephalohematoma. In icterus neonatorum the coagulation period is somewhat prolonged. In latent hereditary syphilis the much prolonged coagulation period is an early symptom which may appear before a positive Wassermann reaction. When anti-syphilitic treatment is instituted the coagulation time becomes shorter. MILL.

Urinary Excretion of Creatin and Creatinin—W. MACADAM, Practitioner (London), April, 1914.

A low creatinin output cannot be regarded as significant of any specific pathological condition. Creatinin is an index of a certain aspect of endogenous metabolism. Creatin is closely, if not directly, related to carbohydrate metabolism. Creatinuria is constantly associated with starvation, either absolute or relative. In some in-

stances in which treatment was possible, as in acidosis, vomiting of pregnancy, cyclic vomiting of children, the administration of glucose led to a disappearance of the creatinuria, so that the factor of starvation reduces itself to a carbohydrate starvation. SACHS.

Fever and Rectal Hyperthermia, Axillary and Pelvic Temperature—
M. ENGLÄNDER, *Deutsche med. Wochenschr.*, May 21, 1914.

Prompted by the well-known fact that immediately after vigorous activity of the lower extremities there ensues considerable increase in the rectal temperature, while the axillary temperature remains normal or even becomes subnormal, author made comparisons between axillary and pelvic temperatures in acute articular rheumatism, heart diseases, orthotic albuminuria and tuberculosis. The rectal temperature is invariably the most reliable; the determination of the pelvic temperature was made by Tiegel's method, i.e. the determination of the temperature of the urine. MILL.

Status Lymphaticus—E. EMRYS-ROBERTS, *Jour. Path. and Bact. (Cambridge)*, April, 1914.

An analysis of 10 cases demonstrates the coexistence of sudden and unexpected death from apparently trivial causes with an enlargement of the thymus, and frequently of the systemic lymphatic glands and lymphoid follicles of the alimentary canal. Sudden death in status lymphaticus is associated with respiratory failure. It is by no means necessarily accompanied by an enfeebled constitution. Unless the enlarged thymus extends forwards or backwards, its anatomical relations do not permit of its interfering with the vagus nerve, or of its inducing reflex spasm of the glottis. In certain well-recognized cases, pressure symptoms on the neighboring structures may be produced by an enlarged thymus. It is questionable if such cases should be classed among cases of status lymphaticus, since anaesthetisation and operative interference are well borne. SACHS.

Menstrual Enlargement of the Thyroid Gland—N. WORONTYSCH, *Wiener klin. Wochenschr.*, June 25, 1914.

Author took repeated measurements of the thyroid glands of 53 women during the menstrual period. Fluctuations in the size of the organ are caused by various factors, and are more frequently met in cases where there is a pathological change of the gland. But a few definite data concerning the fluctuations in size during menstruation could be obtained; it is not certain, though probable, that the increase in volume is produced by menstruation. MILL.

Pituitary Disorder—E. D. BOND, *Am. Jour. Med. Sci.*, April, 1914.

The pathologist of the Danvers State Hospital found evidence of pituitary disease in 45 of out of 1,600 consecutive autopsies on in-

sane patients—and this in routine autopsies from 1879 to 1912, where many glands escaped any sectioning for the microscope. In a hasty examination of 950 patients now in the hospital, 10 cases were upturned whose symptoms suggested pituitary involvement. In the examination of these patients Cushing's four groups of symptoms were kept in mind: (I) general pressure symptoms; (II) neighborhood symptoms, including visual and nasopharyngeal disturbances and uncinat epilepsy; (III) glandular manifestations, including skeletal over-and-under growths, cutaneous and the important hair changes, adiposity, altered carbohydrate tolerance, polyuria, nervousness, and epilepsy again; (IV) symptoms referable to other ductless glands, including infantilism, pigmentation, and persistent thymus.

SACHS.

Influence of Muscle-Work upon the Sugar and Lactic Acid of the Blood—

L. LICHTWITZ, *Berliner klin. Wochenschr.*, June 1, 1914.

Intense muscle-work of short duration, as applied by author, did not cause diminution of the blood-sugar in all normal cases. The blood-sugar, on the other hand, declined below the degree prevailing at the commencement of the rest, when the individual had rested for from 50 to 60 minutes. The formation of lactic acid increased during this time. From these observations, author concludes that the ability for great muscle work depends upon a prompt supply of sugar and a rapid elimination of the produced lactic acid. MILL.

Blood-Sugar in Diabetes—J. MENKE, *Deutsches Archiv. f. klin. Med.*, Vol. CXIV, Nos. 3 and 4.

The blood-sugar in the diabetic fluctuates from hour to hour. The amount of the blood-sugar is dependent, apart from the degree of severity of the diabetic affection, on the diet and the glycosuria. Excretion of the sugar increases the glycosuria, but diminishes the hyperglycemia. There is no parallelism between the degree of the glycosuria and that of the blood-sugar; the kidneys probably take an active part in the excretion of the blood-sugar. An essential difference between the influence of wheaten and oat flour is not recognizable as regards the increase of blood-sugar nor the rapidity of the increase. In 2 cases potatoes produced the same amount of blood-sugar in the same time. The blood-sugar can as yet give no evidence in respect to the success of a carbohydrate cure in diabetes.

WESTERN.

Diabetic Acidosis and CO₂ Tension in the Alveolar Air—L. S. FRIDERICIA, *Zeitschr. f. klin. Medizin*, Vol. LXXX, Nos. 1 and 2.

Examinations made on 8 diabetics showed that there ensues a diminution in CO₂ tension when NH₃ is increased in the urine.

This corresponds to the degree of acidosis as the pulmonary ventilation becomes stronger when the acid content increases. For this reason the determination of CO_2 tension in the alveolar air may be utilized in the determination of diabetic acidosis and its fluctuations.

WESTERN.

Hyperglycemic Obesity—N. RÓTH, Berliner klin. Wochenschr., May 18, 1914.

In a number of the pertaining cases, obesity is developed on a diabetogenous basis. The latter may be hidden on account of an increased impermeability of the kidneys for sugar. This masked condition cannot be recognized in every instance by the administration of 100 grams dextrose; the determination of the blood-sugar must be resorted to. The method of Bang is the best for the general practitioner.

MILL.

Renal Diabetes—A. GALAMBOS, Deutsche med. Wochenschr., June 25, 1914.

Report of a case of renal diabetes. Renal diabetes may be assumed to exist when there are normal or subnormal amounts of blood-sugar, when there is no alimentary hyperglycemia, and when the degree of the glycosuria is more or less independent of the carbohydrate or albumin content of the nourishment. In renal diabetes an acidosis and coma may supervene in the same manner as in diabetes.

MILL.

Acidosis of the Blood in Uremia—H. STRAUB, Münchener med. Wochenschr., July 7, 1914.

In uremic patients with uremic dyspnea the CO_2 tension of the alveolar air, determined according to the method of Haldane, is below normal. In uremia, there appear acid substances in the blood, calling forth an abnormal irritation in the respiratory center, causing thereby diminution of the CO_2 tension in the alveoli and in the arterial blood. Author found that in uremia there occurs an alteration in the dissociation-curve of the blood similar to that which ensues when acid is added to the blood. As far as known, this alteration cannot be brought about by any other means. Addition of urea to the blood does not cause such a change. The alteration is not caused by an increase of CO_2 , but by an increase of other acids. Viewed from this standpoint, there exists an acidosis in uremia.

MILL.

Orthotic Albuminuria and Tuberculosis—F. WENDENBURG, Archiv f. Kinderheilkunde, Vol. LXII, Nos. 1 and 2.

The acetic acid precipitation of albumin is always an expression of a renal affection, probably of the glomeruli apparatus. This lesion may be mechanico-vasomotoric or infectious in origin. Author opines that it is infectious, and that there is a genuine form of

the orthotic albuminuria, in which the position of the kidney causes damage of the glomeruli in the growing individual. This is the chondroituria. Such a kidney is predisposed to infectious influences, and therefore also to chronic nephritic processes. Etiologically, chronic pharyngitis and tonsillitis are responsible for the renal infection. MILL.

Asthenic and Epileptiform Uremia—E. REISS, *Zeitschr. f. klin. Medizin*, Vol. LXXX, Nos. 1 and 2.

Author describes 6 cases of what he calls the asthenic form of uremia. The regular symptoms of this uremic form are: Somnolence, mental indifference, increasing bodily decline, eventually sudden death by heart failure. Metabolic examinations show absolute decrease of substances excreted by the urine, cessation of the concentration-ability of the kidneys, inhibition of the dilution-ability of the blood serum, increase of retention-nitrogen, and augmentation of osmotic pressure in the blood. Frequently associated with these are headache, vertigo, vomiting and itching. Two cases, described as epileptiform uremia, showed epileptiform convulsions, which returned periodically together with an aggravation of the nephritic condition. These epileptiform convulsions disappeared after administration of potassium bromid, and when the renal state improved. Among the negative symptoms are: Psychic well-being in the convulsive-free periods, absence of tangible changes in the external secretion of the kidneys, unaltered blood composition, and the absence of dietary influences. WESTERN.

INFECTIOUS DISEASES

Wassermann Reaction in Children—W. M. ELLIOT, *Glasgow Med. Jour.*, May, 1914.

Author concludes that poorly nourished children are not in that condition to any extent because of syphilitic infection, and that treatment to improve their health need not run on these lines. Eight per cent. of all classes of children from the poorer classes of Glasgow give a positive Wassermann reaction, and if this reaction is to be taken as pathognomonic of syphilis, a considerable proportion of the children of the poorer classes are infected with this disease. Congenital syphilis can exist without any apparent effect on the general health of the child. SACHS.

Noguchi's Luetin Reaction—J. NANU-MUSCEL, C. ALEXANDRESCU-DERSCA and L. FRIEDMANN, *Münchener med. Wochenschr.*, June 9, 1914.

The results of the luetin reaction were the following: Most of the positive results were obtained in cases of tertiary syphilis (ex-

cluding tabes). In these cases the ratio of positive reactions was 89 per cent. In tabes the positive reaction occurred in 20 per cent. of the cases. In secondary syphilis it ensued in 47 per cent. of the cases. In non-syphilitic diseases 98 per cent. of negative results were obtained. Comparison of the Wassermann and the luetin reactions showed that among 15 cases of secondary syphilis there were 2 in which the Wassermann reaction was negative and the luetin positive, while in 37 cases of tertiary syphilis the Wassermann reaction was 12 times negative and the luetin test always positive. These last cases are especially to be noted, as in cases of tertiary and latent syphilis, in which the Wassermann reaction is negative, the luetin test remains the only diagnostic means. While syphilis appears to exist in the cases in which the luetin reaction is positive, a negative reaction does not, however, exclude the presence of the disease.

MILL.

Percutaneous Tuberculin Test (Moro)—E. B. KRUMBAAR and J. H. MUSSEY, JR., *Am. Jour. Med. Sci.*, April, 1914.

The constantly positive reaction in all undoubted early and moderate cases of tuberculosis in adults is a strong indication of the specificity of the reaction. The negative reaction in 90 per cent. of the far-advanced cases indicates that after bodily resistance has been overcome with the probable disappearance of antibodies, the tissues fail to react to the test. As well as in pulmonary tuberculosis, the test is of value in the differential diagnosis of pleural effusions, joint diseases, abdominal tuberculosis versus typhoid fever, etc. The test may be repeated on the same patient without alteration of the results.

SACHS.

Diagnosis of Tuberculosis in Children—J. B. HANES, *Bost. Med. and Surg. Jour.*, May 21, 1914.

In the absence of advanced tuberculosis or a recent infection with some acute disease which might cause a negative reaction, a diagnosis of tuberculosis is rarely justified unless there is a positive skin tuberculin reaction. Constitutional signs and symptoms are usually present and require careful study and investigation. If such symptoms are absent, a definite diagnosis is unwise. The absence of signs referable to the chest and lungs should not preclude a definite diagnosis. If they are present without constitutional disturbance, one should look out for chronic influenza and pneumococcal infection. Diagnosis based on the X-ray alone is apt to be wrong and is unjust to the patient.

SACHS.

Type of Tubercle Bacilli in Tuberculosis of the Lungs and Bronchial Glands—B. MÖLLERS, *Deutsche med. Wochenschr.*, June 25, 1914.

Examination of 974 cases of tuberculosis of the lungs and bron-

chial glands by author and 35 other investigators. The human type of the tubercle bacillus was found 967 times, the bovine type 5 times, and the human and bovine types together twice. MILL.

Secondary Tuberculosis—E. KAHN, *Beiträge z. Klinik d. Tuberkulose*, Vol. XXVIII, No. 2, 1914.

Between the juvenile infections with tubercle bacilli and the "tertiary" pulmonary infection ensuing at an advanced age, the "secondary" forms of the affection may supervene. The secondary forms appear after the virus has been disseminated in the entire organism, i.e. when the tubercle bacilli are circulating in the blood. The microscopic method is not reliable, as not every acid-fast bacillus is a tubercle bacillus. It is evident that various authors mistake certain microorganisms for tubercle bacilli. Acid-fastness itself does not positively prove that a certain bacillus must of necessity be the one of tuberculosis; in the preparations there is always the possibility of mistaking the acid-fast residue of erythrocytes and fibrin with tubercle bacilli. Even the animal experiment, generally giving the most reliable results, may not be faultless. Author was enabled to demonstrate tubercle bacilli by animal experimentation but once in 29 instances. The reason why the bacilli are not more frequently demonstrated in the circulating blood, is that the bacillæmia is a transitory condition in most every case. FRY.

Jaundice in Tuberculosis—J. M. CRUCE, *Am. Jour. Med. Sci.*, May, 1914.

Jaundice occurring in the course of tuberculosis is probably due to some form of tuberculosis of the liver, either extra-hepatic or intra-hepatic. The grade of jaundice is helpful in surmising the pathological condition, intense jaundice being probably due to either pressure of tuberculous glands on the extra-hepatic ducts, or to some form of the solitary tubercles of the liver; milder forms of jaundice are produced by a miliary tuberculosis of the liver.

SACHS.

Lymphogranulomatosis and Tuberculosis—P. BAUMGARTEN, *Münchener med. Wochenschr.*, July 14, 1914.

There are five forms of tuberculosis of the lymph glands: (1) the granular lymphoma or Schüppel's lymphoma; (2) the caseous lymphoma; (3) the indurating tuberculous lymphoma; (4) the fibrous-caseous lymphoma; (5) the lymphogranuloma tuberculosum. All these forms may appear within a circumscribed area or generalized. The fourth and fifth forms, and the intermediary forms between them, are those which occur mostly as generalized affections. Author proposes to call the generalized forms 1 to 4 lymphomatosis tuberculosa, and the generalized form 5 lymphogranulomatosis tuberculosa. MILL.

Quantitative Determination of Albumin in the Sputum of Pneumonia and Pulmonary Tuberculosis—O. MELIKJANZ, Wiener klin. Wochenschr., May 14, 1914.

Results of albumin determinations in 10 cases of pneumonia. In croupous pneumonia the albumin never exceeds 1 per cent. in amount even when the pneumonic process has involved more than one lobe. When the pneumonia is improving, the albumin amount decreases and soon disappears entirely; it was not found later than the thirtieth day of the disease, also then, when the disease was bilateral. The later the albumin appears in the sputum and disappears from it, the more unfavorable is the prognosis. The specific gravity is independent of the form and degree of the affection. Large amounts of albumin existing for a long time point to pulmonary tuberculosis. MILL.

Bacteriological Blood Examinations in Typhoid Fever—S. SASKI, Zeitschr. f. klin. Medizin, Vol. LXXX, Nos. 1 and 2.

Examinations conducted with the blood of 50 cases of typhoid fever. The typhoid bacilli occur very frequently in the circulating blood. This bacteriemia is an almost constant phenomenon in the first week of the disease. It disappears in the course of the following weeks. In some of the cases, even in such of mild character, typhoid bacilli could be demonstrated in the blood during the entire course of the febrile period. As a general rule, there existed, however, a connection between the gravity of the infection and the duration of the bacteriemia. When the course of the infection was mild, bacilli were not, as a rule, demonstrable in the blood during the second week of the disease. In medium severe and severe cases, on the other hand, the bacilli were still encountered in the second or third week. WESTERN.

Tests of the Cure of Gonorrhea—C. M. WHITNEY, Bost. Med. and Surg. Jour., May 14, 1914.

Gonococci were found in carefully treated and apparently well patients by slide examination alone in 5 per cent.; by cultures and slide in $3\frac{1}{2}$ per cent.; and by cultures alone in 2 per cent. of the cases. SACHS.

Döhles Leukocytic "Inclusion Bodies"—W. MACEWEN, Jour. Path. and Bact. (Cambridge), April, 1914.

The inclusion bodies are found in practically every case of scarlet fever during the first week of the fever. After that they tend to disappear. The inclusions are not of etiological importance in scarlet fever. The so-called *Spirochæta scarlatinæ* is not peculiar to scarlet fever, being found in other diseases, and therefore it has

no claim to its title. Inclusion bodies taken along with the general blood picture are an aid to a differential diagnosis. One must always remember that definite sepsis will produce inclusions in the polymorphic cells. SACHS.

Infectious Spondylitis—E. REYE, *Archiv f. Kinderheilkunde*, Vol. LXII, Nos. 1 and 2.

Report of a case of infectious spondylitis in an infant 6½ weeks old. The infection was caused by the staphylococcus aureus resulting in suppurative spondylitis and destruction of the sixth vertebra. There ensued kyphosis, compression of the cord, infection of the pleura. The case terminated lethally. MILL.

RESPIRATORY AND CIRCULATORY ORGANS

Apical Dulness in Childhood—F. MIELKE, *Berliner klin. Wochenschr.*, June 29, 1914.

Some weak-muscled, neuropathic children show an apparent dulness over the pulmonary apices that seemingly points to tuberculosis. This dulness, however, is the effect of anomalous posture. It disappears promptly, when the child has assumed a normal position. MILL.

Reversal of the Cardiac Mechanism—H. B. WILLIAMS and H. JAMES, *Heart* (London), Feb., 1914.

Authors conclude that reversal of the cardiac mechanism is a clinical entity; it may persist for a long time and yields an electrocardiogram whose form is characteristic. Authors studied the heart of a patient who had a slow pulse and symptoms of Stokes-Adams disease. The condition was not one of heart-block. The form of the electrocardiogram is unique. The diastolic interval is a smooth unbroken line, while the ventricular electrocardiogram is distorted by the occurrence of P. about .18 second after the beginning of R. Investigation with X-rays has shown the auricles to be active. The condition had persisted over many months; latterly there were periods of variable duration during which the heart rate was increased. At such times the electrocardiogram reverted to the ordinary typical form. Atropin was without effect on the heart rate and mechanism. When reversal of the cardiac mechanism is produced in dogs, the form of the electrocardiogram resembles in all essential particulars the highly characteristic curves of this patient. SACHS.

Functional Heart-Block—W. E. HUME, *Heart* (London), Feb., 1914.

A consideration of the case described by author and of similar cases in the literature makes it evident that our knowledge of the

etiology of clinical heart-block is incomplete. It would appear that functional as well as organic impairment of the auriculo-ventricular bundle and node may be responsible for the blocking of impulses from auricles to ventricles.

SACHS.

Acidosis Terminating Chronic Myocardial Disease—C. COOMBS, Brit. Med. Jour., June 6, 1914.

Author describes two cases of chronic myocardial disease in which the terminal phase was marked by clinical evidence of acid intoxication (acetone smell in the breath, air-hunger, dyspnea, thirst, and cerebral symptoms). This acidosis was apparently not of the type associated with diabetes and other well-known disorders, in that the B-hydroxyd acids were not present in excess in the urine.

SACHS.

ALIMENTARY TRACT

Tongue-Chewing—B. MYERS, Brit. Jour. Children's Dis., March, 1914.

Tongue-chewing is first noticed about the second year of life and persists until middle age, or perhaps throughout life. It tends to be less noticeable with advancing years. Either sex may suffer from it. It occurs apparently in healthy families in which certain members suffer from habit spasms. Several members of one family may suffer from it. The habit is inherited, as far as one can see, and not copied. The same side of the tongue is always chewed in the same individual. The mental condition is quite normal and the general health is not interfered with in any way. Bromides stop the tongue-chewing, but in time, after leaving off the drug, the habit recommences.

SACHS.

Inflation of the Stomach with Air as an Aid to Röntgen Diagnosis—F. HAENISH, Arch. of the Röntgen Ray (London), April, 1914.

Air inflation of the stomach is an old method rendered valuable by the development of instantaneous röntgenography. In certain cases it is most useful. The shadow on the plate is only of diagnostic value when examined in combination with the screen appearances, the peristalsis, and the alterations on palpation. Moreover, tumors on the anterior or posterior wall of the stomach may be equally well diagnosed by palpation under the screen after a bismuth meal. The shadow of the stomach tube interferes but little with the air picture. An instantaneous röntgenogram shows the contour of the stomach very clearly. The organ appears somewhat distended, and noticeably larger than it does than when tonically contracted around a bismuth meal. One must be careful not to ascribe this appearance to pathological dilatation of the stomach. On the contrary, the pathologically dilated stomach will often give

a picture markedly smaller than the barium picture. The air is introduced into the stomach by means of a rubber stomach tube and an india rubber bellows. SACHS.

Value of Wolff-Junghans Test—F. SMITHIES, *Am. Jour. Med. Sci.*, May, 1914.

When carefully performed and interpreted, the Wolff-Junghans test for the demonstration of dissolved albumin in gastric extracts was positive or suspicious in 80 per cent. of authors' series of cases of gastric cancer. In this series it was a more constant finding in gastric extracts than was the absence of free hydrochloric acid, the presence of lactic acid, and the glycol-tryptophan test. It was rather more constant than tests for occult blood, and the demonstration of motor inefficiency. In extra-gastric malignancy, gastric syphilis, and nephritis, the test is inconstant. In the differentiation between malignant and non-malignant achylia, the Wolff-Junghans test when interpreted in connection with other clinical and laboratory data is of considerable value. SACHS.

Cyto-Diagnosis of Gastric Cancer—P. SIMON and L. CAUSSADE, *Presse méd.*, 1914, No. 28.

Cyto-diagnosis is accomplished by washing the empty stomach with physiological sodium chlorid solution, by centrifugating the wash water, and examining the sediment. When the stomach is dilated, the posture of the patient has to be changed, so that the water comes in contact with all the portions of the stomach. If tissue particles showing carcinomatous formations are obtained in this manner, the diagnosis is, of course, very simple; it is more difficult when it becomes necessary to recognize cancerous degeneration when but single cells are found in the wash water. ZIMMER.

Determination of Surgical Conditions of the Stomach in Chronic Cases—

W. A. BASTEDO and L. T. LEWALD, *N. Y. State Jour. Med.*, June, 1914.

If there is a dysphagia, and the obstruction is at or near the cardia, as shown by the stomach tube or esophageal bougie, there is a condition of cardiospasm with esophageal dilatation, of diverticulum, of connective tissue stricture, or of cancer either of the esophagus or of the lesser curvature of the stomach involving the cardia. In stomach cases a very common history is that of attacks of indigestion, recurring at intervals for years, each attack lasting from one week to three months. The attacks manifest themselves by a peculiar gnawing or empty or gone sensation in the stomach, with a general feeling of lassitude and sometimes nausea, occurring some 3 or 4 hours after meals, night or day, and relieved by sodium bicarbonate or a glass of milk, or even a glass of soda water, and usually made worse by buttermilk. As a rule these patients have

been extensive users of sodium bicarbonate, rhubarb and soda, soda mints, etc. The next question to decide is the nature of the lesion. Is it ulcer, cancer, adhesions, etc.? So far as its surgical status is concerned, that is the same no matter what the lesion, for "food retention calls for surgery." Between early cancer, ulcer and adhesions it may be impossible to make a clinical diagnosis, and then the Röntgen ray may be determinative. If the stools of an obstruction case do not persistently show occult blood, and if repeated test breakfasts given after thorough lavage show a high hydrochloric acidity, one is justified in the diagnosis of ulcer, though one cannot as a rule say absolutely that the ulcer is not beginning to undergo cancerous change. If a tender mass is felt in the pyloric region, if the stools persistently show occult blood, if after lavage the test breakfast gives absence of free hydrochloric acid, one is justified in the tentative diagnosis of cancer, whether there is cachexia or not. The reason for lavage as a preliminary to the test breakfasts in these cases is that when there are fermenting retained contents in a cancer case there is not infrequently free hydrochloric acid, Boas' "hydrochloric acid in retention," while after lavage the test breakfast shows the diagnostic absence of free hydrochloric acid. Also in the stagnation contents of an ulcer case there may be milk sourness from milk taken the day before, and the consequent presence of lactic acid. A non-obstructing ulcer of either duodenum or stomach is not ordinarily a surgical condition. But if the Röntgen ray shows it to be a perforating ulcer, or if, in spite of proper ulcer treatment, it is the site of repeated severe hemorrhage or of persistent hemorrhage, is a constant source of pain or nausea, or interferes persistently with nutrition, it is surgical. Indeed if for any reason whatever it persistently keeps a man from proper attention to his business it requires surgery. Cancer is always surgical, whether obstructive or non-obstructive, unless it has reached the stage of being inoperable. On the one hand we have the cases with palpable tumor, with absence of free hydrochloric acid and the presence of lactic acid in the test-breakfast findings, with constant blood in the stool, and with or without coffee ground material in the stomach. These signs point to cancer, but not to cancer in the early stage. It should be considered, however, as in the operable stage. On the other hand, if the tumor is large and immovable, or is accompanied by metastases or very marked cachexia with enfeeblement, it is in the class of the inoperable.

SACHS.

Digestive Ferments and Fish Poison, so-called—S. W. KONSTANSOFF and E. O. MANOLOFF, *Wiener klin. Wochenschr.*, June 18, 1914.

Fish poison is decomposed by the action of pepsin and trypsin, but is not affected by erepsin. These facts demonstrate that fish

poison belongs to the albuminous substances of highly molecular structure. If it represents a cleavage product of the albumin molecule, it must be one of the very first decomposition stages of the native albumin. Other properties of the fish poison also point to this assumption. MILL.

Intestinal Perforation due to Ascarides—H. PLEW, *Archiv f. Kinderheilkunde*, Vol. LXII, Nos. 1 and 2.

The intestinal wall may be primarily injured by ascarides. This may occur also in locations that had not been damaged by previous diseases. The case reported by author was a child, 3 years old, in whom one of these parasites had perforated the jejunum. This injury resulted in lethal suppurative peritonitis. MILL.

Frequency and Diagnosis of Ascariadiazis—A. LECHLER, *Archiv f. Kinderheilkunde*, Vol. LXII, Nos. 1 and 2.

The frequency of ascariadiazis in children is rather great; in 300 infants after the nursing period, examined at random, ascarides were present in 16.33 per cent. The diagnosis is only definite when the parasites are found in the rectal discharges or when the ovi can be demonstrated in the stools. The Tolemann method possesses no advantages over the simpler microscopic stool examinations. MILL.

Threadworms and Appendicitis—H. LETT, *Practitioner* (London), May, 1914.

Threadworms are essentially a complaint of childhood. Rhemdorf states that threadworms are present in the appendix in 47 per cent. of cases of appendicitis in children, and Still in a series of 200 postmortem examinations on children under 12 years of age found threadworms 38 times. A most interesting result of his investigation was that threadworms were found in the appendix in no less than 25 of these 38 cases, and in 6 of these cases the appendix was the only part of the intestines where they could be found. Clinically they may be present in the appendix without giving rise to any symptoms. They may give rise to a pain in the right iliac fossa which varies from a stabbing to a dull grumbling pain. Tenderness is absent or only very slight. They may cause acute attacks of appendicitis. An important feature in such attacks of appendicitis is that the pulse is no quicker than could be accounted for by the rise in temperature, and that the child does not appear to be nearly so ill as is to be expected from the examination of the abdomen. There are cases in which the patient presents the typical features of severe appendicitis. The appendix may be gangrenous or perforated, and associated with an abscess or general

peritonitis. In the vast majority of these cases, the threadworm appears to be merely incidental.

SACHS.

Typhlo-Albuminuria—HEINRICH STERN, *Am. Jour. Med. Sci.*, Feb., 1914.

Typhlo-albuminuria is an alimentary albuminuria proceeding from the cecum. It is probably the most frequent of all the intestinal albuminurias. It has a recidivating character, that is, it disappears and returns at irregular intervals, and seems to ensue quite independently from the protein intake just preceding it. It may be continuous for several days and again be absent for weeks at a time. Typhlo-albuminuria invariably occurs in persons with habitual constipation, which latter appears to stand in more or less etiological connection with it. Its immediate causative factors are probably analogous to those permitting the transmigration of the colon bacillus from the cecum to the renal pelvis, ureter, or bladder and terminating in colipyelocystitis. These pathogenic factors are cecal atony, the absorption of nearly or all the liquid from the cecum, the resulting extreme dryness of the feces, and coprostasis. At any rate, we cannot speak of a typhlo-albuminuria unless the cecum appears to be at the bottom of the albuminuric phenomenon. The latter may supervene during or after a paroxysm of severe griping pain in the cecum (oftentimes a characteristic of cecal atony), but it is more frequent in those instances of typhlatonia in which there is no definite paroxysm of pain, but constant discomfort due to fulness, compression, or traction at the site of the cecum. While it is now a comparatively easy matter to recognize typhlatonia and to differentiate it from chronic appendicitis the appendix itself may be adherent to the cecum and thus occasion or aggravate the latter's atonic state. The structurally or functionally defective cecum is bound to more or less disturb the intra-abdominal equilibrium in general and the visceral lymphatics in particular. The latter, including those of the cecum itself and its mesocolon, become readily overfilled and a lymph stasis may ensue which in itself may give rise to abdominal and lumbar discomfort. The escape of some of the contents of the engorged lymph channels through newly formed lymph varices near the surface of the lining epithelium of the urinary tract is but a natural consequence. Whenever an anastomosis between the cecal or mesenteric lymphatics on the one hand, and those of the urinary apparatus on the other, is effected, the albuminuric phenomenon may even ensue in the absence of any considerable cecal disturbance, and the typhlo-albuminuria may thus attain a certain degree of chronicity.

SACHS.

Abdominal Emergencies—J. MORTON, *Glasgow Med. Jour.*, April, 1914.

Author describes the following miscellaneous conditions which

caused intestinal obstruction: (1) Extensive chronic inflammatory thickening in the pelvis, simulating tumor. (2) An adherent gangrenous Meckel's diverticulum. (3) Pressure from a very large cystic lymphangioma. (4) Adhesions pulling the great omentum tightly across the transverse colon and constricting it. (5) Loop of small intestine adherent to uterine cicatrix in an old case of Cesarean section. (6) Kink of small intestine due to adhesion to posterior abdominal. This case was sent into the hospital as a strangulated umbilical hernia. The hernia was irreducible, but was not the cause of the obstruction. (7) A case of volvulus. (8) A large gall-stone impacted in the ileum. (9) A large gall-stone or enterolith impacted in the ileum. (10) Adhesions of loops of intestine to cicatrix of old appendix operation. SACHS.

Diagnosis of Disease in Children—J. PORTER, Practitioner (London), April, 1914.

Chronic interstitial pneumonia is usually due to a previous attack of broncho-pneumonia which has never completely cleared up and which has left fibrous thickenings, in which contraction takes place and dilatation of bronchi comes on. If it occurs at the apex, it is practically impossible to distinguish it from tuberculous disease, but it is more common at the base. Dulness and pulling of the heart over to the affected side are the most important physical signs, for the breath sounds vary in the most puzzling way. A not uncommon cause of abdominal pain in girls is an infection with the bacilli coli communis. In children, ascites with fever usually means tuberculosis of the peritoneum. If the effusion is sacculated or accompanied by a palpable mass in the abdomen, this diagnosis is almost certain. A rectal examination is of the utmost importance in the diagnosis of appendicitis in childhood. A finger in the bowel of an infant can explore the greater part of the abdomen, and by it, diseases of the female generative organs, appendix abscess, stone in the bladder or ureter, enlarged glands, intussusception, and abdominal tumors may be made out more readily than by abdominal palpation. SACHS.

Non-Tuberculous Ascites in Childhood—F. J. POYNTON and H. PATERSON, *Lancet*, May 30, 1914.

From time to time, cases of intractable recurrent diarrhea are met with in childhood which, though non-tuberculous in nature, may nevertheless develop ascites. In these cases, following not infrequently an acute infantile gastroenteritis, there develops an obstinate recurrent diarrhea, varied sometimes by intervals of meteorism and constipation. In bad cases there is a profound infantilism, and there may be general anasarca, tetany, celiac symptoms, and even

arthritic changes. The ascites in abdominal tuberculosis is clearly the result of the local irritation of the peritoneum by numberless foci of millitary tubercles; the ascites in these cases of recurrent diarrhea is a transudate which occurs also in all loose tissues, and in very severe cases probably in all the soft tissues of the body.

SACHS.

Mono-Symptomatic Insufficiencies of the Liver—P. LE DAMANY, *Presse méd.*, 1914, No. 41.

There are a number of hepatic insufficiencies with but one single clinical symptom, while the ordinary phenomena of hepatic disease are strangely missing. According to the single symptom, author differentiates a number of forms of this affection. (I) Hemorrhagic forms—(a) Epistaxis. In this form there is uncontrollable nose-bleeding as the only clinical symptom. Diminution of urea in the urine clinches the diagnosis hepatic insufficiency. (b) Purpura. Certain forms of purpura may also be the only expression of hepatic insufficiency. (II) Nervous forms—(a) a painful form with headaches as the only symptom. (b) Delirious form and (c) convulsive form with epileptiform convulsions as the only symptom. (III) Hydropic forms—certain cases of general hydrops are considered by author to be hepatogenous. (IV) Cachectic forms. (V) Mixed forms. The urinary urea deficit suffices, according to author, to diagnose the existence of hepatic insufficiency. He draws attention to the fact that some of his cases exhibited manifestations which were similar to those in nephritic states, and that it is often not an easy task to make a differential diagnosis.

ZIMMER.

Cholecystitis without Stones or Jaundice—W. J. MAYO, *Am. Jour. Med. Sci.*, April, 1914.

The most reliable sign of cholecystitis when the bladder is exposed to view is markedly enlarged glands along the common duct and at the junction of the common and cystic ducts. In cholecystitis of long standing, such lymph nodes may become calcareous. At times the disease will be limited to one area, which will not be detected by merely opening and examining the mucous membrane. In such cases it is necessary to examine the entire gall-bladder. The strawberry gall-bladder is one of the most frequent types of cholecystitis, the mucous membrane being covered with yellow specks.

SACHS.

Urinary Diastase Test and Loewi's Reaction in Pancreatic Lesions—L. HUMPHRY, *Brit. Med. Jour.*, June 6, 1914.

Loewi's test consists in the instillation into the eye of a few drops of a 1:1000 adrenalin chlorid solution; if dilatation of the pupil

takes place within an hour, the test is positive. In cases of pancreatic inefficiency and occasionally in Graves' disease, the test is positive. In these diseases there is an increased susceptibility of the sympathetic nervous system to stimulation by adrenalin. In a variety of diseases the amount of starch-reducing ferment passed in the urine in twenty-four hours is high. Wohlgemuth has perfected a technic for the estimation of the amylolytic ferments. High readings are found in all cases of undoubted pancreatic disease. Author states that the aforementioned tests were very helpful in arriving at a diagnosis in two of his cases. SACHS.

Acute Pancreatitis—A. E. BARKER, *Lancet*, June 6, 1914.

Author successfully operated on 2 cases of acute pancreatitis and has studied the history of 5 other cases, 4 of which were operated on, 3 recovering and 1 dying. In 3 of these cases the patients described similar attacks at long intervals antecedent to that for which they sought surgical help. In none of the cases was there anything in the history to suggest derangement of the biliary apparatus. The onset of the attack in all the cases was strikingly sudden, except in one case in which four weeks of pain after taking food elapsed before the condition was thought grave enough to call for admission to the hospital. Sudden severe pain in the epigastrium was the first and most prominent symptom. Vomiting was usual at the outset, but was not so prominent later on. SACHS.

NERVOUS SYSTEM

The Wassermann Reaction and its Application to Neurology—P. FILDES and J. MCINTOSH, *Brain* (London), Vol. XXVI, Part II.

A positive reaction in the cerebrospinal fluid indicates a syphilitic lesion of the central nervous system. In active untreated cases of dementia paralytica, tabes dorsalis and cerebrospinal syphilis, the reaction is positive both in the serum and cerebrospinal fluid. In cerebral syphilis without involvement of the spinal cord, the cerebrospinal fluid is usually negative. The occurrence of a positive reaction in one of the test-fluids when the other is negative is so common that a reaction found negative in one fluid only is insufficient to exclude syphilis. Pure parasymphilitic lesions do not respond satisfactorily to treatment, as shown by the slight effect upon the reaction in the cerebrospinal fluid. Cerebrospinal lesions react very readily to treatment. The provocative injection of salvarsan for the purpose of exciting an exacerbation of the reaction had some, but probably an exaggerated diagnostic value. SACHS.

Syphilis and Insanity—G. H. SAVAGE, Practitioner (London), May, 1914.

Syphilis may be a cause of congenital mental defect; it may be a cause of preventing healthy development of the brain; or it may interfere with the development by the senses, and may thus lead to defective education. It may give rise to convulsions, which may either become established as epilepsy, or may lead to mental weakness. It may also affect the moral development; and cases with a syphilitic inheritance have, in the author's experience, not infrequently been morally defective in one way or another and incapable of recognizing their social duties. Syphilis may cause hypochondriacal feelings, and the presence of stigmata may make the patient believe that he is a suspect, and may thus give rise to delusions of suspicion, melancholia, and suicide. Congenital syphilis is almost certainly the cause of adolescent general paralysis. Ordinary general paralysis, locomotor ataxia with mental symptoms, are associated with a history of syphilis. Besides these, there are many forms of dementia depending on arterial degeneration which may produce general brain decay, or local troubles, such as softening or apoplectic seizures.

SACHS.

Progressive Paralysis and Tabes in Relation to Syphilis—E. MEYER, Berliner klin. Wochenschr., May 25, 1914.

Notwithstanding the demonstration of spirochetes in the brain of paralytics by Noguchi, there is no occasion to overthrow our conception of the clinical picture of paralysis. It is agreed that certain therapeutic measures may beneficially influence paralysis and tabes, but a real progress in the amelioration of these cases will only ensue when the cases and the remedial measures are carefully selected, and if a careful clinical control be instituted. MILL.

Diagnosis of Neurasthenia—O. SCHELLONG, Zeitschr. f. klin. Medizin, Vol. LXXX, Nos. 1 and 2.

Objective symptoms like exaggerated patellar reflexes, vasomotor reddening, tremor of the lids, tongue tremor, finger tremor and increased pulse frequency, are each for itself of no value in making a diagnosis of neurasthenia, as they are often present in entirely normal individuals. However, when a number of these symptoms are associated with each other, one may assume with a high degree of probability that there exists an increased nervous irritability. Even then, though, the associated symptoms furnish no definite proof. Marked tongue tremor justifies the assumption of an increased nerve irritability in about 50 per cent. of the persons examined; marked finger tremor also in about the same percentage; very rapid vasomotor reddening in only about 29 per cent.; high pulse rates of 100 and more in only about 24 per cent. of the persons exam-

ined for neurasthenia. The least value in the diagnosis of nervous irritability is attached to the lid tremor and the lively knee reflexes.
WESTERN.

Diagnosis of Epilepsy in Childhood—E. B. SMITH, Practitioner (London), April, 1914.

One-fourth to one-third of all cases of epilepsy start in the first ten years of life. Idiopathic epilepsy, the kind of convulsions here considered, occurs in two forms in children: as a transient unconsciousness, petit mal; and as a severe convulsion, grand mal. An attack of grand mal may be heralded in by a sudden incontinence, an attack of vomiting, or a sense of suffocation. Petit mal is frequently a source of error in diagnosis, and is sometimes entirely overlooked for years. Parents will tell that the child has attacks of staring, changes color, faints, or has momentary staggers, or funny feelings. In one case the child simply falls and as rapidly picks itself up again. In another, there may be a mere sudden forward movement of the head, as in nodding. In a third, the child stands motionless, or may stagger slightly, the eyes having a curious far-away look, as if staring into space. In a fourth, this sudden fixed attitude may be associated with a transient paleness and flushing of the face. More rarely, the only thing that calls for notice is some mischievous, senseless, dirty, or entirely inexplicable act or expression. These acts are generally referred to as examples of post-epileptic automatism, and their recognition is of extreme importance for the welfare of the child. Sometimes a ridiculous remark, an outburst of laughter, or incontinence of urine or feces without any knowledge of the act are the only indications of an attack.
SACHS.

Unusual Manifestations of Hemiplegia—PANSKI, Deutsche Zeitschr. f. Nervenheilkunde, Vol. LI, Nos. 1 and 2.

There are a number of manifestations belonging to hemiplegia that are mostly considered to be of no import, or are regarded as mere complications. These manifestations, no doubt, are due to the same cause as the paralytic symptoms themselves. There are bulbar symptoms as salivation, disturbances of articulation, anomalies of deglutition, hearing and taste (perverse taste), and pareses of the muscles of mastication. There are also other manifestations, among which may be mentioned thick coating of the tongue, stubborn hiccough, vesical disturbances, and more rarely fecal incontinence. In order to obtain a comprehensive view of this entire symptom-complex, it is necessary that one accepts a direct shock (transmitted activity) emanating from the main lesion and transmitted to more distant centers (diaschis theory of Monkow).

WESTERN.

Diagnosis of Brain Tumors—EICHELBERG, *Deutsche Zeitschr. f. Nervenheilkunde*, Vol. LI, Nos. 3 to 6.

On the hand of 43 cases that came under author's observation, the value of certain symptoms of import in brain tumor diagnosis is dwelled upon. The localization of the brain tumor may be accomplished in from 70 to 80 per cent. of the cases. But only in about 5 per cent. of the cases is it possible to perform a radical operation. In the cases in which a radical operation cannot be undertaken, one is justified to try mercurial and iodine treatment. Only when internal treatment has not availed, and the eyesight has become impaired, palliative trepanation may be made. WESTERN.

URINARY ORGANS—MALE GENITALIA

Functional Diagnosis of Pathological Renal Conditions—H. MACHWITZ, M. ROSENBERG and J. TSCHERTKOFF, *Münchener med. Wochenschr.*, June 9, 1914.

Determination of renal function by means of iodine and lactose does not furnish important disclosures as regards diagnosis, prognosis and therapeutics. The value of the chlorin test concerns especially the therapeutic field; in diagnostic respect its value is decidedly less. Water and concentration tests are of import in the chronic vascular forms (nephritides and scleroses) in the differential diagnosis between the stages with and without insufficiency. Nitrogen retention in the blood serum points to vascular disease. The nitrogen retention is a reliable indicator of the degree of the insufficiency, and furnishes, therefore, important diagnostic and therapeutic points. MILL.

Infectious Diseases of the Urinary Organs during Infancy (so-called Pyelo-cystitis)—H. L. KOWITZ, *Münchener med. Wochenschr.*, June 16, 1914.

Author has had 40 cases of pyelo-cystitis in infants which in every instance was preceded by some acute gastrointestinal condition. These intestinal disturbances were always present during the warm weather. He holds that these infections are always hematogenous in origin. The colon bacillus is the most common organism found in these cases, author having isolated the bacillus in pure culture in 24 cases. In 10 cases the organism was one of the para-colon bacilli. Three cases that had either eczema or furunculosis showed staphylococci in the urine. Three other cases were mixed infections, one having colon bacilli and some saphrophytes, one colon bacilli and streptococci and the other colon bacilli and staphylococci. KAUFMAN.

Traumatic Nephritis—A. Pousson, Jour. d'Urologie, June, 1914.

The author reviews the literature on this subject with the histories of 12 cases with an additional case of his own. Hematuria was found in all but 3 of the cases, although it did not develop until several days later in some of the cases. Fever may not be present until days or even weeks later. Edema may come on at once and is more liable to develop on the side corresponding to the injury. The symptoms resemble those of Bright's disease and the autopsy findings are identical with those found in that condition. The opposite healthy kidney is in time also affected, not only by the irritation of the renal nervous system, but also by the absorption of toxins from the diseased organ.

KAUFMAN.

Familial Disposition to Scarlatinal Nephritis—P. BODE, Jahrbuch f. Kinderheilkunde, Vol. LXXIX, No. 4.

Like other observers, author found that there are families in which scarlatinal nephritis occurs frequently. The cause of this phenomenon is as yet unknown.

MILL.

Some Observations on Tuberculosis of the Kidney—J. M. RENTON, Brit. Med. Jour., April 11, 1914.

Author takes up the pathology of renal tuberculosis and recites the history of 5 cases. He draws attention to the following points: One should not be misled by the absence of renal pain, as many cases do not have this symptom; frequency of urination and pyuria which do not clear up under treatment demand that a careful search be made of the urine for organisms and that the patient be carefully examined cystoscopically; the appearance of the ureter mouth may not be very characteristic; in a given case the ureter mouth may be swollen and the corresponding kidney normal, while in another case there may be only a slight amount of hyperemia around the orifice and the corresponding organ badly diseased. If one ureter shows unmistakable signs of tuberculosis, author catheterizes only the opposite side. If the case is a doubtful one, he catheterizes both ureters. Thickening of the pelvic ureter, which may be felt on vaginal or rectal palpation (as pointed out by Fenwick), is very strong evidence of tuberculosis of the kidney on that side. The urine should be carefully examined for pus, tubercle bacilli, and the percentage of urea determined.

KAUFMAN.

FEMALE ORGANS OF GENERATION—PREGNANCY—PARTURITION—INFANTS**Urinary Incontinence in Women**—H. A. KELLY and W. M. DUNN, Surg., Gynecol. and Obstet., April, 1914.

There is a type of urinary incontinence in women without manifest injury to the bladder and having no relation to fistula, which

most frequently comes on following childbirth, but is occasionally seen in nulliparæ. In the authors' series of cases, 85 per cent. were among women who had borne children. This type of urinary incontinence is due to an impairment of the function of the sphincter muscle at the internal orifice of the urethra. It begins, as a rule, with slight leakage, which gradually grows worse, leading to complete incontinence with all its unfortunate and repellent sequelæ. It is not cured by any known means, and although numerous operations have been devised, no one has been pre-eminently successful.

SACHS.

Hyperemesis Gravidarum—O. BONDY, *Monatsschr. f. Geburtshilfe u. Gynäkologie*, Vol. IXL, No. 6, 1914.

Report of 5 pertaining cases. The hyperemesis is a pregnancy toxicosis on a neuropathic basis.

MILL.

Habitual Pregnancy-Interruption and Internal Secretion—F. LEHMANN, *Archiv f. Gynäkologie*, Vol. CI, No. 1, 1914.

By essential habitual pregnancy interruption (abortion, miscarriage, premature birth) is understood the recurrent premature interruption of pregnancy in the same woman without a tangible cause of the same in the mother as well as in the offspring. Treatment with potassium iodid and iron has been accompanied with success in all essential forms. The glands with internal secretion are varyingly active during pregnancy, but there is as yet not sufficient observation material accumulated to formulate any theories. That much, however, may be stated that in women with essential habitual pregnancy-interruption the vicarious character of the internal secretions is somehow interfered with.

MILL.

Pregnancy and Tuberculosis Mortality—C. VAN TUSSEN BROEK, *Archiv f. Gynäkologie*, Vol. CI, No. 1, 1914.

Results of statistic investigations in the Netherlands. The mortality of tuberculosis is increased during the first six months after delivery; in the following six months it is decreased. Thus increase and decrease compensate each other. The mortality of tuberculosis a year after parturition is the same as the general mortality of tuberculosis in mature women. The tuberculosis mortality—contrary to the general opinion—is not markedly increased by pregnancy and the puerperium, and there is no justification in interrupting pregnancy in the presence of a tuberculous disease.

MILL.

Recent Publications

BLOOD-PRESSURE IN MEDICINE AND SURGERY. A Guide for Students and Practitioners. By EDWARD H. GOODMAN, M.D., Associate in Medicine in the University of Pennsylvania. Illustrated. Philadelphia and New York, Lea and Febiger, 1914.

The determination of the blood pressure has become such an integral part of diagnosis that there are very few clinicians left who think that they can get along in practice without employing it. On the other hand, there are many, especially among the younger set of physicians, who are inclined to more or less overestimate sphygmomanometric findings, and to give them fanciful and altogether too far-fetched interpretations. It is a pleasure, therefore, to come across such a modest little manual as that of Dr. Goodman, in which the subject is treated in an entirely scientific fashion, without exaggeration in one way or another. To those of our readers who have no book on blood pressure and all it implies, the work of Dr. Goodman is most heartily recommended.

H. S.

THEORIE UND PRAXIS DER BLUTENTZIEHUNG. Nach dem gegenwärtigen Stande der Wissenschaft bearbeitet von Prof. Dr. HEINRICH STERN, in New York, Oberarzt für Innere Medizin am St. Mark's Hospital; Consultations-Arzt für Innere Medizin am Methodist-Episkopal (Seney) Hospital, am Staatskrankenhaus zu Central-Islip, am Diakonissen-Heim, an den Hospitälern zu Port Chester, Glens Falls, u.s.w., Begründer und Redakteur des "Archives of Diagnosis"; früher Vorsitzender der Sektion für Pharmakologie und Materia Medica der American Medical Association; Präsident der Manhattan Medical Society; Fellow der American Urological Association; Fellow der New York Academy of Medicine, usw. usw. Würzburg, Verlag von Curt Kabitzsch, Kgl. Univ. Verlagsbuchhändler, 1914.

This is the first comprehensive work on bloodletting that has appeared since many years. After an admirable historical introduction of the subject, the author brings chapters on "Functional changes after bloodletting," "The technic of bloodletting," "Bloodletting in diseases of the respiratory organs," "Bloodletting in circulatory disturbances," "Bloodletting in uremia," "Bloodletting in eclampsia," "Bloodletting in narcomania," etc., etc. He also dwells in separate chapters on bloodletting in children, and on the prophylactic possibilities of bloodletting.

This work, it seems to us, has appeared just at a psychological moment when the medical man pauses and remembers that after all he ought to do a little more for his patient than is recommended by his old stand-by text-book.

While we cannot be but thankful to the author for this welcome book, we cannot refrain from asking him the pertinent question, why has not he—a live American—written the work in English instead of in German?

T. F. R.

THE INTERVERTEBRAL PORAMEN. An Atlas and Histologic Description of an Intervertebral Foramen and its Adjacent Parts. By HAROLD SWANBERG, Member American Association for the Advancement of Science. With an Introductory Note by Prof. Harris E. Santee. Illustrated by 16 Full Page Plates, None of which have Ever Before Appeared in Print. Chicago, Chicago Scientific Publishing Co., 1914.

This book is a serious attempt to cast a new light upon a subject that is as yet but little understood. It should prove of special value to those interested in spinal therapeutics.

H. S.

MEDICAL AND SURGICAL REPORTS OF THE EPISCOPAL HOSPITAL, IN PHILADELPHIA. Vol. II. Edited by ASTLEY P. C. ASH-HURST, M.D. Philadelphia, 1914.

If the work done by the medical and surgical staffs of a hospital (even if it is not strictly a teaching institution) be assembled and as well edited as this volume, it will not only confer credit upon the various authors and upon the hospital in whose wards their experience is gained, but will be of material benefit to the wider medical circle reached by it.

H. S.

PRELIMINARY CLINICAL HISTORY BLANK. Designed by J. MADISON TAYLOR, A.B., M.D., of Philadelphia, Pa. Made and sold by F. A. Davis Company, Philadelphia.

This blank of four pages will be found of immense value in the study of an individual's past and present medical state. It is to be made out by the patient (or family), enabling him to make an orderly outline of leading circumstances in physical history, bringing to mind half-forgotten facts, any one of which may exert an important influence in solving problems requiring the services of a physician. The latter will save a great deal of time, and will arrive at a much better understanding of his new chronic cases, by giving one of these blanks to each patient to fill out at his leisure before he calls the second time.

H. S.

MEDICAL GYNECOLOGY. By SAMUEL WYLLIS BANDLER, M.D., Fellow of the American Association of Obstetricians and Gynecologists; Adjunct Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital; Associate Attending Gynecologist to the Beth Israel Hospital, New York City. Third Edition, Thoroughly Revised. With Original Illustrations. Philadelphia and London, W. B. Saunders Company, 1914.

Bandler's Medical Gynecology needs no introduction at this late day. It has become the standard work in its line. To the present edition has been added a very thorough chapter on the glands with internal secretions and their bearing upon the healthy and diseased woman. The book should not only be in the hands of the gynecological specialist, but also in those of every practitioner of general medicine.
L. B. S.

A MANUAL OF CLINICAL DIAGNOSIS BY MEANS OF LABORATORY METHODS, For Students, Hospital Physicians, and Practitioners. By CHARLES E. SIMON, B.A., M.D., Professor of Clinical Pathology and Experimental Medicine at the College of Physicians and Surgeons; Pathologist to the Union Protestant Infirmary and the Hospital for the Women of Maryland; Clinical Pathologist to the Mercy Hospital of Baltimore, Maryland. Eighth Edition, Enlarged and Thoroughly Revised. Illustrated with 185 Engravings and 25 Plates. Philadelphia and New York, Lea and Febiger, 1914.

There is only one paragraph which we wish to add to the review of the preceding (7th) edition of Simon's Clinical Diagnosis (ARCHIVES OF DIAGNOSIS, 1912, p. 208), namely, the oftener we have occasion to consult this book, the more we appreciate its completeness and reliability.
H. S.

IMMUNITY. Methods of Diagnosis and Therapy and their Practical Application. By Dr. JULIUS CITRON, Assistant at the University Clinic of Berlin, II Medical Division. Translated from the German and Edited by A. L. GARBAT, M.D., Assistant Pathologist and Adjunct Visiting Physician, German Hospital, New York. Second Edition, Revised and Enlarged. 30 Illustrations, 2 Colored Plates and 8 Charts. Philadelphia, P. Blakiston's Son and Co., 1914.

This book of Dr. Citron does not delve into theory any more than is absolutely necessary. It is a manual for the practical medical man, who is bound to appreciate it. It imparts about all that is known about immunity—immunity in the larger sense. The translation is done very well.
H. S.

DIAGNOSIS IN THE OFFICE AND AT THE BEDSIDE. The Use of Symptoms and Physical Signs in the Diagnosis of Disease. By HOBART AMORY HARE, M.D., B.Sc., Professor of Therapeutics, Materia Medica, and

Diagnosis in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical College Hospital; one time Clinical Professor of Diseases of Children in the University of Pennsylvania; etc. Seventh Edition, Thoroughly Revised. Illustrated with 164 Engravings and 10 Plates. Philadelphia and New York, Lea and Febiger, 1914.

We cannot give this book, whose former title was "A Text-Book of Practical Diagnosis," a better recommendation than by quoting the words which we wrote about it on the occasion of the publication of its sixth edition (ARCHIVES OF DIAGNOSIS, 1908, p. 335):

"Hare's Diagnosis does away with the *laissez-aller*, *laissez-nous faire* in the study of diagnosis. It is not the usual exposé of the diagnostic features of the various diseases, generally encountered in the text-books on diagnosis, which the author offers, but a systematic discussion of the symptoms used in diagnosis, and of their employment in arriving at the proper understanding of the nature of the case under examination. In practice, a diagnosis can only be constructed by grouping and regrouping the symptoms, and with this idea in mind the entire book has been written. A number of very useful illustrations materially enhance the value of the work."

H. S.

THE ARCHIVES OF DIAGNOSIS

A QUARTERLY JOURNAL DEVOTED TO THE STUDY
AND THE PROGRESS OF DIAGNOSIS AND PROGNOSIS

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FOUNDED AND EDITED BY
HEINRICH STERN, M.D., LL.D.
New York



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Special Articles

ON THE PROGNOSIS OF CHRONIC MYOCARDIAL INSUFFICIENCY (FIBROID DEGENERATION)

By HENRY L. ELSNER

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Myocardial degeneration is the most frequent of all lesions of the heart causing death. It is a disease of advanced life; when found early in life it usually leads to prompt death if not due to syphilis. Women are not as often affected as men, and when they are the disease shows itself later than in men. The heart lesions which are increasing with surprising rapidity are of a degenerative fibroid character, they progress insidiously without marked physical or subjective symptoms during a long period; the patients present for treatment as a rule, after the initial stage, when complex conditions exist.

It may be assumed that the degenerative process is brought about by interference with the proper nourishment of the heart muscle through the *coronary arteries*. The result is *sclerotic or fibroid change in the musculature of the heart*. The heart in these cases passes through a period during which it is overtaxed because of faulty pabulum to its muscle elements and there is usually a long existing and unrecognized *hypertension* with added *toxic conditions*.

The influence of *faulty metabolism, long continued worry and*

strain, syphilitic infection and obstructive changes in the peripheral capillaries as found with arteriosclerosis of the kidney and mesenteric vessels is of paramount importance etiologically as well as for prognosis.

An overworked heart with peripheral obstruction and associated high blood pressure is likely to yield when extra demand is made upon it. This is particularly true when there is advanced coronary disease. Cases detected in the initial stage without marked distant (arteriosclerotic) changes and not progressive, which are tractable and able to follow the directions of the physician, are often favorably influenced by treatment. The prognosis will depend entirely upon the associated conditions, the capacity of the myocardium, which can be tested by safe methods, the age of the patient and the underlying cause.

Conditions are often complex even in the early stage of myocardial weakness and in many cases make prognosis exceedingly difficult, often impossible.

If during the initial stage there are attacks of steno-cardia (angina pectoris) and these are severe, the chances of materially prolonging such a life are small.

Early evidences of stasis, particularly enlarged liver and spleen, with cardiac asthma, are among the unfavorable features, as are also dyspnea and symptoms referable to the peripheral vessels.

It is unfortunate for many of these cases that the patient is often unconscious of myocardial disease until the heart reserve has been exhausted. The symptomatology associated with similar lesions is so variable in different cases as to mislead the clinician and the patient. Mackenzie says that "at first sight the 'symptoms' are hopelessly confused." "I have submitted to Professor Keith a large number of hearts affected by changes associated with arteriosclerosis from patients ranging from forty-two to seventy-seven years of age, and in all the post mortem appearances had such a close resemblance that it might have been assumed that during life the symptoms would have been identical." This, however, is not the case. Some patients suffer from serious anginous attacks, and in the intervals present no evidences of myocardial disease, while others with exactly similar lesions present the continuous symptoms of muscular weakness; still others present no evidences

of any lesion in either subjective or objective symptoms, but suddenly there is either an acute dilatation, a pulmonary edema, the development of arrhythmia, extra systoles, suddenly arising evidences of extreme muscular insufficiency, the pulsus alternans and prompt death. Others develop dropsies, while with exactly the same lesions there are often no dropsies. The functional disturbances, therefore, are differently influenced in different cases by the same lesions. It is impossible for the physician, as Allbutt has said, to draw a parallel "in the living patient between the formidable works of decay described by the pathologists; how and when these degenerations are manifested; how, in the long course of cardiac decay, the imminence of death is to be foreseen and provided against; or how, indeed, we are to know that any such process is at work at all; or lastly, how in a case of known heart disease the degrees of its advancement and of the cardiac reserves are to be noted and tested." "Thus we have the physician and the pathologist trotting each on his own side of the hedge, each intent upon his own scouting and his own bearings, and neither able as yet to reconcile his own observations with those of his comrade."

The *blood pressure study* of fibroid degeneration offers varying results. *Early high blood pressure* (hypertension) with symptoms of myocardial degeneration sufficient to make the diagnosis possible, is as unfavorable as *hypotension* with the same subjective complaints.

Sudden decided fall of blood pressure with small and rapid pulse and distant heart sounds is always evidence of insufficient heart power. *High blood pressure, without evidences of coronary involvement* in subjective symptoms, *without aortic insufficiency, without arrhythmia*, with or without an aortic systolic murmur, but with the pulse pressure approaching the normal (40 to 60 mm. Hg.) may be considered favorable for the continuation of life, and the patient is often able to continue his occupation if it is not too taxing, mentally or physically. These patients are materially influenced by *auto-suggestion*; the personal element plays an important rôle, and the prognosis is often improved by the tactful consideration of existing conditions with abundant and justified reassurance and the judicious planning for the future.



Too much importance has been given to systolic blood pressure by the lay world, often by the physician, without a just estimate of the many collateral conditions to be considered in all cases of myocardial degeneration.

High systolic blood pressure with myocardial fibrosis in patients beyond 55 years is often without unfavorable effect. There is a class of cases in which the myocardial degeneration progresses rapidly; it includes men who work under unusual strain, who often develop hypertension which is promptly followed by hypertrophy of the left ventricle and for some reason the associated kidney cirrhosis progresses with equal rapidity. The duration of some from the beginning of the subjective symptoms which brought the patient to the physician to the end, has been less than four months. These are exceptional conditions. The revolt of the myocardium in the terminal stage is associated with dyspnea, erratic heart action and nocturnal edema in some, cardiac asthma in others.

Early evidences of edema are not encouraging, neither are the symptoms of stasis within the portal circuit (liver engorgement and gastritis).

Pallor with vertigo arising suddenly, with or without arrhythmia, particularly on slight exertion, are warnings of weakness which when unheeded lead to serious results, at times sudden death.

Physical signs which show marked dilatation and embryonic heart sounds in any stage of fibroid or any other myocarditis are always suggestive, worse with dilatation of the left than the right ventricle. With angina pectoris and myocarditis the ventricles are not dilated as a rule, though the outlook may be exceedingly grave.

With emphysema, chronic bronchitis and marked kyphosis the evidences of right ventricular dilatation are often borne during long periods and with improved conditions (often possible) the dilatation disappears.

Accented second pulmonic sound is always evidence of insufficiency of the mitral valve and with fibroid degeneration the insufficiency is likely to be relative.

The advanced and unfavorable symptoms often follow an acute exacerbation; an anginous seizure or a suddenly arising cardiac asthma, or nocturnal pulmonary edema may be followed by continuous symptoms of decompensation. Severe dyspnea may persist after

such acute attacks and may never disappear. In a number of cases *evidences of stasis in the liver and dropsies of the serous cavities (hydro-thorax, hydro-pericardium, occasionally ascites and edema of the extremities)* develop; marked *arrhythmia* becomes continuous, there is *albuminuria with reduced urine*, excessive *nervousness*, finally *orthopnea* and death ends the scene.

Physical examination of the heart in the terminal stages shows marked dilatation of the left ventricle, systolic murmurs over the mitral and aortic areas are frequent, the second pulmonic sound is accented and with hypertension and interstitial nephritis the second aortic sound is also snappy and loud.

In another class of cases the heart is so exhausted that the sounds are indistinct, distant and embryonic in character. With increasing weakness, the heart becomes rapid and as already suggested *arrhythmia* is a further evidence of myocardial insufficiency.

There are cases of serious fibrosis of the myocardium in which the pulse gives absolutely no indications of the existing condition; this is of great importance. Even with normal frequency, rhythm and blood pressure, advanced degeneration may be present and increase rapidly.

A normal pulse which is markedly influenced, i.e., accelerated by slight exertion, is always suggestive of myocardial degeneration. Persistent rapidity as well as marked bradycardia and instability as shown by decided variation in the frequency and character of the pulse are serious. Experience teaches that a heart which has been overtaxed or in which a lesion has been recognized which suddenly becomes erratic or shows that its reserve is being reduced by the development of any form of arrhythmia is an organ which demands a guarded prognosis. Many such hearts may again "find themselves" but they are not dependable, such organs are easily fatigued, they revolt on slight cause, are likely to desert when but little overtaxed, they dilate unexpectedly. On the other hand, favorable cases are met which after serious evidences of weakness regain sufficient force to live in comfort with proper care during long periods. "In no organ is this lack of concord between the signals of life and death so disconcerting as in the heart." (Allbutt).

Fibroid myocarditis once established is never cured. It can be



controlled in many cases by rational living. Its extent naturally influences the prognosis as well as the many associated conditions.

Sudden death occasionally occurs without previous warning of the existence of any lesion. This is not frequent. But few die in whom a thorough consideration of symptoms and physical examination would have failed to lead to a correct diagnosis.

Diabetes, gout and other diseases as well as faulty diet for metabolic faults, the use of thyroid extract for obesity, continued mental strain, acute disease, particularly influenza, often prove depressing factors which promptly invite progression of existing degeneration.

The fate of the myocarditic patient often depends on his own acts. It is surprising to note how many of these patients with weak hearts (degenerated) continue to live in favorable surroundings and conditions with a minimum of symptoms during many years when they give the heart the rest which it needs.

Errors of diet, excesses of any kind, may promptly shorten life, which with rational treatment, temperance and sobriety might have continued during a considerable period.

The effect of *tobacco, tea, coffee, alcohol and sexual indulgence* demand the closest scrutiny in the individual case, and if the patient wishes to prolong his life, he must be willing to make sacrifices and forego many pleasures.

In favorable cases the effect of rest and treatment is comparatively prompt and is followed by the disappearance of threatening symptoms.



THE DIAGNOSIS OF ABNORMALITIES OF MYOCARDIAL FUNCTION

By T. STUART HART

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II.

CLASSIFICATION OF DISTURBANCES OF MYOCARDIAL FUNCTION. THE
REGULAR HEART. THE IRREGULAR HEART. BRADYCARDIA.
HEART BLOCK.

CLASSIFICATION OF DISTURBANCES OF MYOCARDIAL FUNCTION

The ideal analysis of myocardial functions is based on an examination of the fundamental properties of the muscle cells. Such an examination would show that—

Stimulus production is normal, increased or diminished.

<i>Excitability</i>	"	"	"	"	"
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<i>Conductivity</i>	"	"	"	"	"
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<i>Contractility</i>	"	"	"	"	"
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<i>Tonicity</i>	"	"	"	"	"
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If there is a departure from the normal, (i. e. a depression or an increase in one of these properties) the abnormality may involve the entire musculature or a limited portion of it. Such a classification should therefore indicate the location or site of the abnormality. That is to say, it should indicate the particular part involved, as, for example, the sinus node, the auricular tissue, the auriculoventricular node, the bundle of His or one of its branches, the ventricular muscle, etc., etc.

To complete such a classification the etiological condition should be investigated and we should assign the change in function to some underlying condition, anatomical, nutritional, reflex, etc.

While at present the state of our knowledge and our means of obtaining evidence in regard to all these factors are too incomplete to permit us to make a final analysis in every instance and to assign the existing abnormality to a definite change in one or more of the fundamental properties of cardiac muscle, with an exact site

and an accurate causal factor, we are able to accomplish this to a limited extent, but the advances of the past decade, the result of careful clinical observations and well conceived experiments on animals give us promise of a more extensive field in the near future. It is important that the study of remedies should be based upon a similar analysis so that we may know, for example, whether a particular drug or hydrotherapeutic procedure will heighten or depress excitability in a particular portion of the heart and thus lead us to its logical utilization in correcting an abnormal state of this property.

As an example of the present possibilities of the use of such a classification, we may cite a case in which we have evidence that all the fundamental properties are normal except that of conduction. We may also have evidence that the conduction is depressed and that the abnormality is localized in the cells of the bundle of His, if the patient has been taking large doses of digitalis (we know that digitalis depresses conductivity), we may find that the withdrawal of this drug allows the cells to recover their property of conduction to the normal degree.●

CLINICAL CONSIDERATIONS

For the clinician one of the most common and often an early feature of change in myocardial function is an alteration in the rate and rhythm of the heart action. Since we are to consider these myocardial changes from the standpoint of the everyday practitioner it will be well for us to take our start from this point, and to subdivide our cases into classes, grouped on the basis of easily elicited physical signs, viz. varieties of rate and rhythm. By the employment of graphic methods and other means at our disposal we will endeavor to further analyze each group and to point out as far as we are able the fundamental properties which are disordered, the site of the abnormality and its cause. We will therefore consider our cases in the following groups:—

- (A) Regular.
- (B) Irregular.
 - (1) Bradycardia
 - (2) Tachycardia

- (3) Sinus arrhythmias
- (4) Extrasystoles
- (5) Alternation
- (6) Complete irregularity

THE REGULAR HEART

By the term regular heart we understand one which conforms to the rule (*regula*) of the normal heart. As opposed to the term regular, the term irregular heart includes all changes in rate, rhythm and character of cardiac contractions which do not conform to the rule of the normal heart.

What then are the rules of the normal heart beat?

(1) The *rate* of the normal heart is not fixed at any definite figure; it is dependent on the needs of the body at any particular moment. The heart is a pump which has its greatest efficiency when it is maintaining the needs of the individual organism with the least expenditure of cardiac energy. Hence the rate, whether too fast or too slow which *per se* falls short in maintaining an adequate circulation or which does this with an undue expenditure of energy is inefficient and therefore not according to the rule of the normal heart.

Within such limits the rate may vary and yet be normal, but such variations must be gradual. Change in rate in the normal heart is accomplished by a change in the length of the diastolic period, but to conform to the rule the difference in length of successive diastolic periods must be infinitesimal. A regular heart always has a rate within the normal limits, but a heart with a normal rate may be irregular since in some other features it does not conform to the rule of the normal heart.

(2) The *rhythm*; the rule of the normal heart is that it must not only beat rhythmically, but also that the rhythm must have a special well-defined character; the individual cycles which compose the rhythm must all be of the same kind and size, and the diastolic portions of successive cycles must be of equal length.

A regular heart is always rhythmic, but a rhythmic heart is not necessarily regular.

The *pulsus alternans* is an example of heart activity which is perfectly rhythmic and yet, according to our definition, is

irregular; it is composed of alternating large and small beats which succeed each other at equal intervals and is therefore absolutely rhythmic, yet since the kind of rhythm does not conform to the rule, since successive beats are unequal in size, it falls into the class of irregularities.

(3) The *pacemaker* of the regular heart is the sinus node; when any other portion of the heart either customarily or occasionally initiates the stimulus which results in a contraction, this heart must be included in the class of irregular hearts.

(4) In the regular heart the wave of contraction must sweep over its chambers in *an orderly sequence* and the *stimulus must follow the path which we have learned to recognize as normal*. Any deviation in the path which the stimuli follows or any abnormality in the sequence of contraction of the chambers brings it into the group of irregular hearts.

(5) In the regular heart not only must *the stimulus* sweep over the heart by the normal paths and in the normal direction, but it *must travel at a speed which is normal*. Any delay in transmitting stimuli places a heart among those classified as irregular.

(6) Among other features to which the heart must conform to be considered regular are uniformity in the size and duration of successive systoles, and a condition of the muscle mass which is somewhat short of complete relaxation during diastole.

The departure from the normal in (1) *rate* and (2) *rhythm* are easily detected by the ordinary methods of inspection, palpation and auscultation. An abnormal (3) *pacemaker*; an unusual (4) *path* or *direction* taken by the *stimulus*; (5) a delay in the *speed* of the *passage* of the *stimulus* and the finer *variations* (6) in the *character of the contractions of the ventricles* are often best detected by the employment of graphic methods, but when one has once become familiar with the evidence obtained by such means, physical signs are quite sufficient in the majority of instances to afford us data upon which to base a correct interpretation of the abnormalities which are present.

THE IRREGULAR HEART

In the preceding section it was stated that the group of irregular hearts includes all those which show a departure from the normal

in rate, rhythm and character of contractions. In the succeeding paragraphs an attempt was made to define the "rules" of normal cardiac activity. We will next consider the various types of irregular hearts which are distinguished by well defined changes in rate and rhythm.

Abnormal changes in rate

Under irregularities of the heart are included all those changes of rate which exist at the expense of the functional efficiency of the heart. The normal heart is a machine which provides the individual at any particular moment with a sufficient blood supply, and at the same time is working with an economical expenditure of energy; it is working at an optimum. The adaptation of the rate of the heart to the needs of the body is controlled very largely through the extracardial nerves. Anatomical and functional evidences show that for the most part the fibers of the right vagus and the right accelerator (sympathetic) nerves terminate in the tissues in the region of the sinus node while the left vagus and left accelerator are more particularly distributed to the auriculo-ventricular node and the tissues junctional between the auricle and ventricle. By reflex activity through these paths the rapidity of stimulus production is modified. There is considerable physiological and clinical evidence that both these nerves possess what is known as "tone," that their activity is continuously modifying the stimulus production of the cells of the heart; the vagus tends to hold this property in check, the accelerator tends to heighten its activity; it is through a correct balance of these forces that the heart activity is varied with the momentary demands of the organism.

Hypertonus of either of these nerves results in a heart rate abnormally rapid or abnormally slow.

Among the factors which modify the rate of the heart are individual differences in the age, size of body, build, work, temperature, nervous constitution, arterial pressure, etc., etc.

Bradycardia

It is well to recall first of all that a slow pulse is not necessarily synonymous with a slow heart. The heart contractions may be of such unequal strength that only a portion of them are detected in

the radial artery; some of the systoles may be so lacking in force that the resulting arterial wave may be insufficient to affect the pressure in the radial artery, or again they may even fail to open the aortic valves (*pulsus frustrans*). We should therefore always check up our finding of a slow pulse by counting the apex beat by auscultation. Hence a radial count alone is not sufficient to establish the existence of a bradycardia.

All really slow hearts are comprised in two classes.

- (1) True Bradycardia.
- (2) Heart Block.

(1) In *true bradycardia* all the chambers of the heart contract at a slow rate and in the normal sequence and relationship. It might be fairly questioned whether such hearts should be included in the class of irregular hearts, since although slow, their activity is usually efficient in maintaining an adequate circulation, economical in the expenditure of energy, and in other respects conforming to the rules of the normal heart. However, some of these hearts are too slow to properly supply all parts of the organism with sufficient blood, and therefore this group of bradycardias may fairly be included among the irregular hearts.

A slow heart is not a very rare occurrence, a rate between 50 and 60 is common in tall persons, in those with increased arterial pressure, aortic stenosis, pregnancy, convalescence from acute fevers, in typhoid fever, meningitis, chronic nephritis, cerebral hemorrhage and tumors; it is often associated with jaundice and some digestive reflexes such as vomiting, etc. When we attempt to classify these heterogeneous clinical manifestations it seems reasonable to divide them into two groups:

- (a) *Toxic agents* which probably have a direct depressing effect on the sinus node (typhoid fever; jaundice).
- (b) *Heightened vagus tone* either from direct irritation of the pneumogastric center (meningitis, cerebral hemorrhage), or a reflex activity (vomiting, pregnancy, increased arterial tension, etc.).

It is to be noted that a true bradycardia is due to a depression of activity of the sinus node, either through the chemical constitution

of its blood supply, or through the nervous influences brought to it through the extracardial nerves, particularly the right vagus. The change which takes place in the node is a depression of the property of the formation of stimulus material or of its excitability, or both; at present we have no clinical method of determining which one of these properties is the one affected in any particular case.

At a later time the effects of vagus activity will be more fully discussed; in passing it will be sufficient to note that by the administration of atropin, vagus impulses may be cut off and thus a clinical estimate may be made of the influence which it has hitherto been exerting.

A true bradycardia is never encountered with a rate under 40. Probably every heart with a rate less than this belongs to the second group of slow hearts, viz.:

(2) *Heart block*, which is the result of interference in the conduction of stimuli from one part of the heart to another. Theoretically such an abnormal condition may occur in any part of the musculature of the heart, practically it is rarely recognized except when it involves the bundle of His or one of its branches. Here the cells of the conducting system are grouped in a narrow band so that a very limited lesion or functional derangement of moderate extent is sufficient to produce marked clinical phenomena.

In accordance with the degree of functional disorder we may recognize:

- (a) Total Heart Block, complete dissociation.
- (b) Partial Heart Block, partial dissociation.
- (c) Delayed Conduction, without dissociation.

(a) *Total Heart Block; complete dissociation*

It will be recalled, as was pointed out in the paragraphs on the anatomy and function of the heart tissue, that stimuli normally originate in the sinus node, thence spread over the auricle to the auriculo-ventricular node of Tawara where connection is made with the bundle of His; through this the impulses pass to be distributed first by the two branches of the bundle, and later by its subdivisions and their connections with the Purkinje's fibers to all parts of the ventricular muscle. It will also be recalled that in the Stannius ex-

periment on the frog's heart, when the second cut or ligature is applied so as to separate the auricle and the ventricle, the auricle continues to contract rhythmically in the normal manner and after a considerable pause the ventricle begins to contract at a slow rhythm entirely independent of the auricular contractions. This is precisely what happens in man when the property of conduction of the bundle of His is destroyed. The auricles continue to contract in a normal manner in response to the rhythmic stimuli arising in the sinus node; these impulses are unable, however, to pass the obstruction in the bundle of His and hence are unable to influence the activity of the ventricle. Since, however, the uninjured portions of the bundle still possess the fundamental properties of the production of stimulus material and excitability, stimuli will be set free at this point and the ventricle will respond by slow rhythmic contractions entirely independent of the contractions of the auricle and of the stimuli originating in the normal pacemaker. This condition is known as *complete dissociation* and the activity of the ventricle as the *ideo-ventricular rhythm*.

(b) *Partial Heart Block; partial dissociation*

If the bundle of His is not completely functionally severed but is merely injured so that the property of conduction is depressed (that is to say if the formation of the molecules upon which the conduction of impulses is dependent is abnormally slow) the ventricle may not respond to every impulse from the auricle. This condition is known as *partial dissociation*. If the ventricle ordinarily responds to the stimuli from the normal pacemaker, and only occasionally fails to contract in this manner, the condition is known as the *dropped beat*. If the ventricle responds to every second or third auricular contraction it is called a *2 to 1* or a *3 to 1* rhythm. Or, if for every 5 beats of the auricle we have 3 contractions of the ventricle the condition is known as *partial dissociation with a 3 to 5 rhythm*. At times the periods of ventricular response may be so long that an occasional stimulus may be initiated in the bundle and we then have a *partial dissociation with interspersed ideo-ventricular contractions* ("escape of the ventricle").

(c) *Delayed Conduction without dissociation*

The conducting tissues may be so affected that the rate of con-

duction may be much less than the normal so that the passage of the stimulus from the auricle to the ventricle consumes a period of time appreciably in excess of what is usual; if, however, the ventricle responds to each stimulus originating at the pacemaker there is no dissociation. This form of impaired function may easily pass over to a partial heart block, or even a complete block and a single case may exhibit grades of conduction changes comprising delayed conduction, partial and complete block on successive observations.

PATHOLOGY

Heart block of all degrees has been produced experimentally by various procedures which have had for their object the destruction or injury of the bundle of His. Ligature of the bundle in the perfused heart (Humblot) and the dog's heart in situ (Erlanger), crushing by means of an auriculo-ventricular clamp (Erlanger), section of the bundle in the perfused heart (Cohn and Trendelenburg) have uniformly produced some degree of block whenever subsequent histological examination demonstrated injury to the bundle. Heart block has been produced by stimulation of the vagus (Chauveau) and as a direct result of asphyxia (Lewis, Sherrington). Various degrees of temporary or permanent block have been produced by the injection of various cardiac poisons such as digitalis (Cushny, Tabora), adrenalin (Kahn), aconite (Cushny), muscarine and physostigmine (Rothberger and Winterberg).

Cases which have exhibited the evidence of heart block have almost invariably shown some histological alteration in the bundle of His when such an examination has been made. As a general rule the degree of heart block corresponds with the extent of the histological change which is found in the bundle; a complete heart block usually corresponds to a complete destruction of the bundle, while delayed conduction is more apt to be associated with a moderate degree of infiltration; in the exceptional case a complete block may occur with but very little apparent histological change and a case of partial block may exhibit an extreme degree of bundle destruction. These exceptional cases merely emphasize the fact that histological observations can not always be relied on to measure the degree of functional impairment.

Probably the lesion of the bundle of His which has been most frequently found is the result of a syphilitic infection; either a

gumma or an old syphilitic scar; calcareous nodules, chronic inflammatory changes, fibrosis, calcareous degeneration and necrosis involving the bundle, have been found; more rarely an ulcer penetrating the septum; atheromatous changes in the central fibrous body; fibroid and epithelial tumors have been described. Acute inflammatory conditions may be present with leukocyte infiltration and degeneration of the cells of the bundle.

ETIOLOGY

In addition to the cases of distinct syphilitic origin, others seem to bear a direct relationship to the more acute infections. More or less severe cases of heart block have followed diphtheria, typhoid fever, influenza, septic poisoning, puerperal fever and pneumonia; these diseases naturally supply the etiological factor in heart block as found in youth and young adults. In elderly people the lesion, when not syphilitic, is often merely a phase of one of the common general chronic inflammatory or degenerative processes, whose etiology is still for the most part shrouded in so much obscurity. The degenerative changes accompanying arteriosclerosis of the coronary arteries are sometimes associated with various degrees of heart block.

There is a group of cases, the majority of which show only mild grades of interference with conduction, which are undoubtedly of rheumatic origin. Mackenzie was the first to draw attention to this group. Many of them have had pericarditis or endocarditis particularly with involvement of the mitral valve. There seems to be little question that the acute and subacute rheumatic inflammatory processes have a tendency to implicate not only the pericardium and the endocardium, but the myocardium as well. Keith's examination of hearts which had been observed clinically by Mackenzie¹ showed that the inflammatory process had a tendency "to extend from the base of the valve into the central fibrous body, and to involve the bundle."

It has been pointed out that experimentally toxic doses of digitalis may produce block in the normal heart; the administration of such doses is, of course, impossible in many, but the effect of moderate doses of digitalis and other drugs of the same group on hearts with impaired conduction may often be observed in the

clinic. Given in such cases digitalis usually lengthens the conduction time and may even induce a partial or a complete block. The question is still unsettled as to whether digitalis acts in these cases directly on the heart tissues or through the vagus nerve.

Heart block has been produced experimentally by stimulation of the vagus nerve. It is a question whether a clinical heart block can be initiated by vagal changes, but in damaged hearts the conduction abnormalities may be accentuated by vagal reflexes. A very beautiful illustration of this influence is a case reported by Mackenzie²; the conduction time was usually slow and the reflex obtained by swallowing repeatedly produced a partial block when the patient was under the influence of digitalis. Conduction disturbances following vagus stimulation have been studied by Robinson and Draper³, who have published some very beautiful electrocardiograms showing changes in conduction of various degrees. They reached the conclusion that the left vagus has as a rule a greater influence on the property of conduction than the right vagus.

IDENTIFICATION

Clinical: When the pulse rate is under 60 one may suspect some degree of interference with the property of conduction; in such a case, however, one should always compare the rate of cardiac contractions as determined by auscultation with the pulse rate, since not infrequently one finds a large number of ventricular systoles which are so inefficient as to make no impression on the radial pulse (when at a later time we take up the discussion of extra systoles and auricular fibrillation it will be pointed out that in these conditions many ventricular contractions may be detected on auscultation over the precordium which afford in the radial artery no evidence of their presence).

If the heart is perfectly rhythmic and has a rate in the neighborhood of 30 it is practically certain that a complete block is present. A faster ventricular rate does not, however, rule out the possibility of a complete block, 8 out of 34 cases of complete

1. Mackenzie, *Diseases of the Heart*, p. 179.

2. *Ibid.*, p. 340, also Plate IV, Figs. 258 and 259.

3. *Journal of Experimental Med.*, Vol. XV, No. 1, 1912.

block which I have studied by graphic methods had a ventricular rate of over 45.

In a partial block the ventricle may contract rhythmically or at times may be quite arrhythmic, the rate, while usually a slow one, is as a rule faster than in complete block. A partial block is to be suspected when the ventricular rate suddenly changes to one half its former rate. A single dropped beat is usually due to a partial block, but this can only surely be determined by the evidence of graphic records.

When the pulsations of the jugular vein are visible they are of considerable aid in making a diagnosis of the character of the irregularity. In complete block the jugular pulsations are usually rhythmic, but occur at much more frequent intervals than and quite independent of the ventricular impulses. Occasionally there may be seen a large jugular pulsation in place of one of the usual smaller ones, and if this phenomenon is closely observed it will be apparent that it occurs at a time when the ventricle contracts synchronously with the jugular pulsation, that is when the auricles and ventricles contract simultaneously. In incomplete block the jugular pulsations usually bear a definite numerical ratio to the ventricular contractions, for example, we may see in a 2 to 1 block two jugular pulsations to one apex beat, or three jugular to two ventricular in a 3 to 2 block, etc.

In delayed conduction it is sometimes possible to detect a longer than the normal interval between the first venous wave and the carotid pulsation, or this prolonged interval may become evident when we note the time by which the first wave of the jugular pulse precedes the apex beat.

In a few cases of block a low muffled sound may be heard during ventricular diastole; this is the auscultatory evidence of the auricular contraction which is sometimes heard; when this occurs soon after the second sound or a distinct interval before the first sound it sometimes gives the impression of a reduplication of the second or of the first sound, as the case may be.

In certain cases of mitral stenosis associated with heart block there have been described (Mackenzie) short, harsh murmurs which occurred synchronously with the pulsations of the jugular vein and quite independent of the ventricular contractions. These were as-

cribed to the acceleration of the flow of blood from auricle to ventricle at the time of the independent auricular systole. When present this sign should be of assistance in recognizing the independent activities of the auricles and ventricles; personally it has never been my fortune to see such a case.

The Adams-Stokes syndrome, attacks of unconsciousness associated with a slow pulse, should always suggest the possibility of heart block.

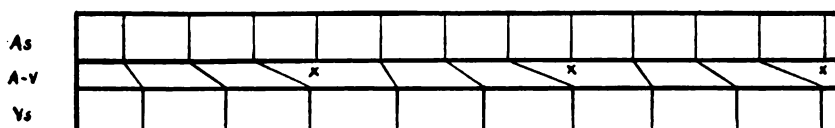


FIG. 1

DELAYED CONDUCTION PRODUCING PARTIAL BLOCK

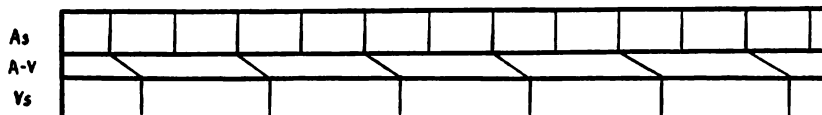


FIG. 2

PARTIAL BLOCK

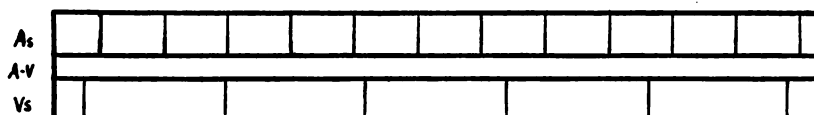


FIG. 3

COMPLETE BLOCK

Polygraphic Tracings (Figs. 4, 5 and 6) will usually give conclusive evidence of conduction defects when these are present. If this property is only moderately depressed, the ventricle (as shown by the apex or arterial tracing) will have a normal or slow rate and the intersystolic periods will be uniform in length (Fig. 4), the jugular tracing, representing the activity of the right auricle will show an *a* wave preceding each *c* wave at a uniform interval, but this *a-c* interval will exceed 0.2 second, the time occupied by the normal *a-c* interval.

If conduction is a degree more defective the arterial pulse may show a rhythmic activity indicated in diagram (Fig. 1), the

diastolic periods gradually increase in length until the longest pause is reached at the time of a "dropped beat," then suddenly this period is shortened only to be again gradually lengthened until another beat is dropped. When we examine the auricular diagram we see that the auricular (*a*) waves recur at regular intervals; the *a-c* interval following the "dropped beat" may be normal, 0.2 second, in length (it usually exceeds this) but each successive *a-c* interval is longer, since the property of conduction is becoming more and more exhausted, and each ventricular response is thus delayed until one of the auricular impulses reaches the junctional tissues while they are still in the refractory state, hence no impulse is conveyed to the ventricle and a "dropped beat" results. At the time of the next auricular impulse the long preceding rest has considerably restored the functional condition of the auriculo-ventricular bundle, consequently the *a-c* interval is much shorter and the ventricular response is prompt. This rhythmic lengthening of the ventricular cycle superficially resembles the respiratory *sinus arrhythmia*, it can be differentiated from this condition by observing that in conduction defects (1) the rhythmic change in the length of the ventricular cycles is not synchronous with the phases of respiration; (2) the *a* waves of the jugular tracing are separated by equal intervals; (3) the *a-c* intervals exceed 0.2 second.

When the conduction is even more abnormal the arterial pulse, will be slow (usually 40 to 50 per minute). In the jugular record rhythmically recurring *a* waves will be found (Figs. 2 and 5), but the ventricle responds only to every other or every third impulse from the normal pacemaker. The *a-c* interval when present may be of normal duration; it is usually prolonged.

In complete block (Figs. 3 and 6) the arterial pulse is slow, usually 30-35 per minute and perfectly rhythmic, in the jugular tracing are found the equally spaced *a* waves which bear no fixed relation to the ventricular waves. The *a* waves are equidistant from one another as are also the *c* waves but the two rhythms are entirely independent of one another.

The *Electrocardiogram* furnishes evidence of conduction defects which is even more clear than the polygram.

As was pointed out in the first paper of this series the *P* wave represents auricular activity, *Q R S T* ventricular activity.

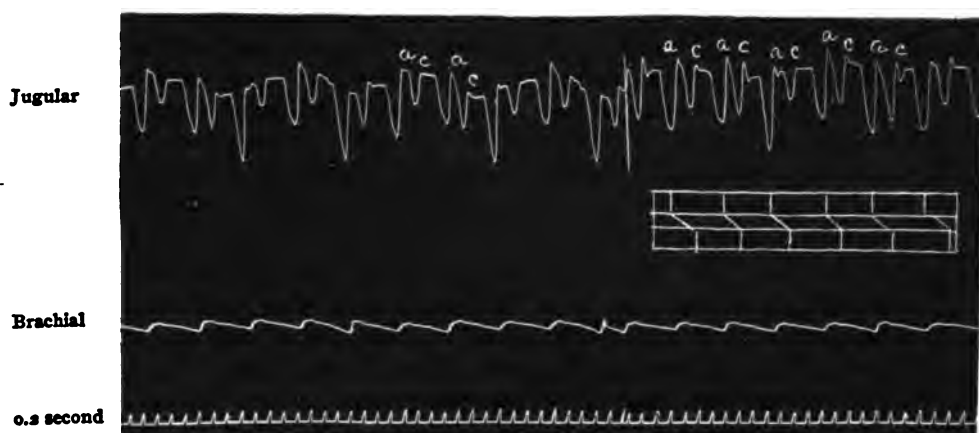


FIG. 4

Delayed conduction. No dissociation. a-c interval = 0.3 second. Auricular rate = 73. Ventricular rate = 73.

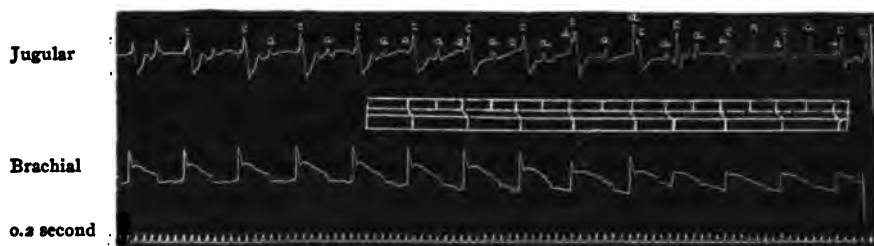


FIG. 5

Partial block. For the most part this is a 2 to 1 block, but occasionally an extra auricular impulse passes the block. Auricular rate = 92. Ventricular rate = 42.



FIG. 6

Complete block. Auricular rate = 98. Ideo-ventricular rate = 31.

Normally the *P-R* interval, measured from the beginning of the *P* wave to the beginning of the *R* wave, is between 0.14 and 0.18 second; a *P-R* interval occupying more than 0.18 second indicates a delay in the passage of the stimulus from the auricle to the ventricle and is due to a defect in the property of conduction.

The simplest form of this irregularity is shown in Fig. 7, the pulse is beating slowly and rhythmically at a rate of 60. Each ventricular complex is of the normal type and is preceded by a *P* wave; the *P-R* interval is always of the same length but is excessively long measuring 0.37 second. Such a heart on physical examination might show little deviation from the normal but the electrocardiogram makes very evident the underlying defect.

The record of a case of partial block resulting in a "dropped beat" is shown in Figs. 1 and 8. The *P* waves are picked out from such a record with little difficulty. The ventricular complexes (*Q R S T*) are quite normal in form except when they are distorted by a superimposed *P* wave. The *P* waves of the first two cycles shown in the record are easily recognized, if one measures the time between these *P* waves (approximately 0.6 second) and, beginning with one of these easily identified *P* waves, lays off on the remainder of the record intervals similar in length, one will find at each one of these points a wave either clearly defined or appearing as a notch changing the normal form of the ventricular complex; these are the *P* waves representing the auricular activity which recur rhythmically at equal time intervals. The *P-R* intervals vary in length from 0.18 second to 0.43 second; this gradually lengthening indicates a progressive exhaustion of conductivity, at last (at *x*) the period becomes so long that the ventricle contracts spontaneously (known as the "escape of the ventricle") without waiting for an impulse to reach it from the normal pacemaker; the auricular impulse (indicated by the *P* which merely notches the ascending limb of the *R* wave at *x*) reaches the ventricle while it is in the refractory period, hence there is no ventricular response to this impulse. After the rest thus afforded to the junctional tissues the ventricle responds promptly to the next auricular impulse and the *P-R* interval measures only 0.18 second only again to be gradually lengthened. The record shows an auricular rate of 102, a ventricular rate of 89. The

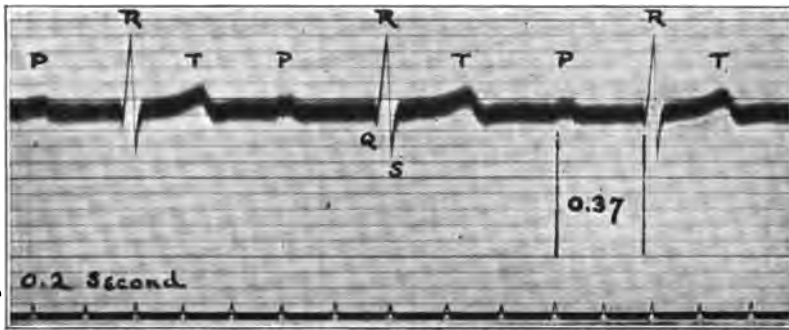


FIG. 7

Delayed conduction. Every ventricular complex (QRST) is preceded by an auricular complex (P). The P-R interval is excessively long, 0.37 second. The notch in the P wave is a slight abnormality not infrequently seen in cases of mitral stenosis. Auricular rate = 60. Ventricular rate = 60.

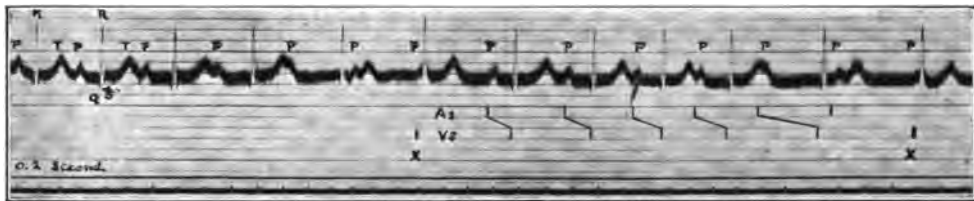


FIG. 8

Partial block. Auricular rate = 89. Ventricular rate = 102. P-R = 0.18 to 0.43 second. Note gradual lengthening of the P-R interval resulting in the "escape of the ventricle" at x, also the rhythmic lengthening and shortening of the ventricular cycles. P recurs at equal intervals of time, but its relation to the ventricular waves varies, note how the P wave distorts Q.R.S. and T at various points.

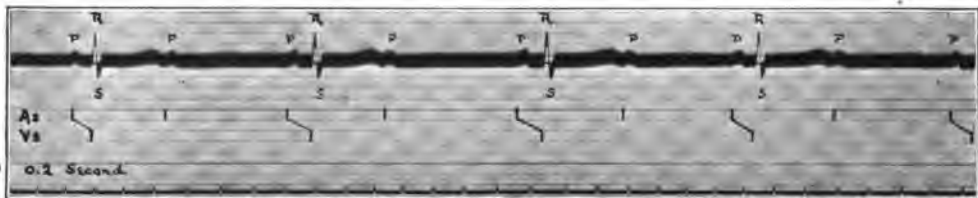


FIG. 9

Partial (2 to 1) block. Auricular rate = 86. Ventricular rate = 43. Every other auricular impulse is blocked. P-R interval = 0.15 second. Note alternate short and long auricular cycles (sinus arrhythmia) and slow regular contractions of the ventricle.

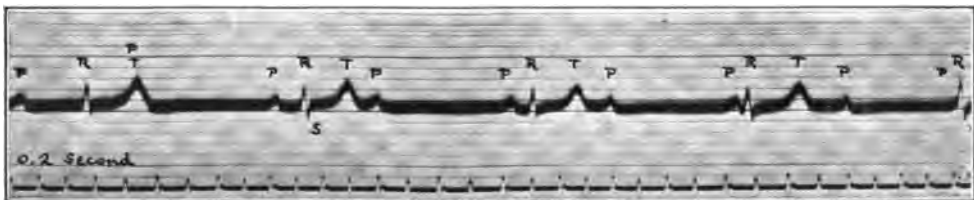


FIG. 10

Complete block. Auricular rate 60. Ventricular rate 37. The auricular and ventricular activities are entirely independent of each other. Note P is slightly notched. The ventricular complex (RST) is normal in type except when distorted by a superimposed P wave.

mechanism which underlies the gradual lengthening and the sudden shortening of the ventricular cycles is quite evident.

Another type of partial block is shown in Figs. 2 and 9. In this case the ventricle responds to every other auricular impulse. The *P-R* interval conforms to the normal length (0.15 second) but the exhaustion of the *A-V* bundle is shown in its inability to transmit the next succeeding impulse coming down from the sinus, so that ventricular responses and "dropped beats" alternate, showing a 2 to 1 block. The existence of a sinus arrhythmia evidenced by the alternating short and long periods between the auricular contractions, may be, in this case, an additional element in favoring a partial block. If the auricular responses were equidistant it is quite possible that the junctional tissues would have recovered sufficiently to convey the impulse to the ventricle, but the shortened auricular diastole which regularly follows a ventricular response does not allow enough time for the recovery of the functionally defective conduction.

A comparison of these two cases of partial block represented in Figs. 8 and 9 is interesting. In the first case (Fig. 8) the auricle contracts regularly, the ventricle irregularly. In the second case (Fig. 9) the auricle contracts irregularly, the ventricle regularly and at a much slower rate than in the preceding case. The irregularity in each case is a rhythmic one. In the first case a regular auricle associated with a defect in conduction produces a rhythmic irregularity of the ventricle. In the second case the rhythmic irregularity of the auricle associated with a defect in conduction produces a regular activity of the ventricle.

The electrocardiogram of a case of complete block is shown in Fig. 10. Here it is to be noted that the ventricular complexes (*R S T*) are normal in form except when they are distorted by superimposed *P* waves which recur at regular intervals but with no fixed relation to successive ventricular complexes. The *P* waves are equidistant from one another but fall in any portion of the ventricular cycle (both systole and diastole). The ventricle is contracting at the rate of 37 and is perfectly regular, the auricle with a slight arrhythmia contracts at a rate of 60. The activities of the upper and lower chambers are quite independent. This complete dissociation of auricles and ventricles is entirely charac-

teristic of complete block. No impulses can pass from the auricle to the ventricle and each has its independent rhythm. The pace of the auricle is set by the normal pacemaker of the sinus node. The ideo-ventricular pacemaker is in this case located in the bundle of His above its bifurcation (if the impulses which initiate the contractions of the lower chamber were in some other portion of the ventricular musculature, as is sometimes the case, the ventricular complexes would be of an entirely different type).

Only those cases have been described which represent distinct types of block; it should be said, however, in passing that a single case may present various degrees of block at different times, delayed conduction, partial and complete block may present themselves in a single case at successive periods and more rarely one may follow a case passing through the stages of complete and partial block back to a condition of normal activity.

A number of the simpler and more common types of partial and complete auriculo-ventricular block have been discussed; this list, however, by no means exhausts the varieties of heart block which are seen in the clinic. Block associated with sinus irregularities, extrasystoles and auricular fibrillation are some of the types which will be taken up in subsequent chapters.

The differentiation of a block produced by an organic lesion from that resulting from a hypertonic condition of the vagus may often be made by noting the effect of the administration of atropin. In cases of vagus block, the paralyzing of the terminal nerve endings with atropin abolishes the block.

THE AUSTIN FLINT MURMUR—ITS MODE OF PRODUCTION, RECOGNITION AND IMPORTANCE

By ROBERT ABRAHAMS

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In 1862 Austin Flint described a murmur in the July issue of the *Am. Jour. Med. Sci.*, presenting the following features, namely: The murmur is presystolic in time, it is heard over the apex and is

due to aortic insufficiency instead of mitral stenosis. He reported cases "in which this murmur was marked, the autopsy showing no mitral lesions, but aortic lesions permitting free regurgitation."

Apparently this new murmur attracted little attention, as is shown by Flint's gratifying reference¹ to one single case "in which a mitral presystolic murmur existed without mitral lesions, free aortic regurgitation existing, which was reported by Dr. John Guiteras in the Med. News, Nov. 14, 1885."

Thus, for more than two decades this interesting murmur lay dormant in the dusty archives of medical literature.

Since the last mentioned period, however, the Flint murmur compelled increasing attention; to-day, we find teachers teaching it, clinicians recognizing it and the architects of text-books giving full expression to it.

Flint's explanation of *the mode of production* of his murmur is not as clear and comprehensive as that given by recent authors.

To quote from his text-book on medicine: "In some cases in which free aortic regurgitation exists, the left ventricle becoming filled before the auricles contract, the mitral curtains are floated out and the valve is closed when the mitral current takes place."

A more intelligible explanation is offered by Anders and Boston (Medical Diagnosis, 1911 page 247). "It is supposed to be due to the floating inward of the anterior leaflet of the mitral valve by the regurgitating blood from the aorta, so that the stream of blood coming into the left ventricle from the left auricle meets with obstruction."

Another and equally plausible explanation for the occurrence of the murmur is offered by Butler (Diagnostics in Internal Medicine, 1909, page 373): "The Flint murmur is attributed to an extreme dilatation of the left ventricle preventing the cusps of the mitral valve from folding back to the ventricular walls during diastole. By remaining in the blood current a species of relative narrowing is produced and a vibrating presystolic murmur arises."

After observing a fairly large number of the Austin Flint murmur I came to the conclusion that the mode of production is as follows: The diastolic murmur of aortic insufficiency which is invariably heard at the fourth left interspace close to the edge of the

1. Flint's Practice of Medicine, 1886, page 335.

sternum, and which is typical of the aortic disease, that same diastolic murmur takes a dive through the heart or under the heart and reappears at the apex. There, at the apex, the diastolic murmur is by usage designated presystolic. The aortic diastolic when it thus clandestinely, as it were, makes its appearance at the apex to constitute the Flint presystolic murmur is neither audibly continuous with nor traceable to the original source, namely the fourth left interspace. The apical presystolic sounds like an independent murmur.

In offering this theory for the Flint murmur I will state that I am fully cognizant of the fact that many aortic diastolic murmurs are heard at the apex, but they are traceable from base to apex and apex to base. Those murmurs, however, which are destined to give rise to Flint's murmur take a dive when they reach the fourth left interspace, discard their audibility on their journey and become audible at their reappearance at the apex.

The recognition of the Flint murmur is a simple matter. The murmur that it may be confounded with is the organic mitral presystolic due to mitral stenosis.

By adopting an old-fashioned method of illustration the clinical features of the two murmurs will be placed in parallel lines:

MITRAL PRESYSTOLIC MURMUR

1. Murmur heard loudest at the apex, transmitted about an inch toward the sternum.
2. The quality of the murmur is harsh, grinding, grating or blubbering.
3. The mitral presystolic ends in a loud, at times, violent thump or thud.

PRESYSTOLIC AUSTIN FLINT MURMUR

1. Heard at the apex and limited to the apex.
2. The quality is soft, sometimes slightly harsh, always showing the quality of the parent murmur.
3. The Flint murmur terminates softly and is followed by a normal first sound of the heart.
4. The Flint presystolic is only present when aortic regurgitation is present (in a small percentage of cases).

It is needless to add that in studying this subject with a view to differential diagnosis no one would commit the error to stop at the murmur. The respective signs and symptoms of aortic insufficiency and mitral stenosis would finally emphasize and differentiate the two valvular lesions.

However, the possibility of an association of both valvular defects should be borne in mind. When this combination occurs it will be found that the striking physical signs of mitral stenosis are rarely weakened by the presence of aortic regurgitation.

The *importance* of the Austin Flint murmur centers around the following points:

(1) The diagnosis. A correct interpretation of the condition furnishes the observer an intellectual pleasure, a pleasure which is found in the solution of every complicated clinical problem. The Flint murmur is conceded to be a sign of excessive dilatation of the left ventricle; cardiac dilatation is one of the most important indications for treatment no matter what the lesion is.

(2) Prognosis. It is important to determine whether one or two lesions affect the valvular systems of the heart. The prognosis of aortic insufficiency is proverbially unfavorable; it is a disease of sudden death. The prognosis in mitral stenosis is next in fatality. Pity the victim of the two. Now, in a given case, if one can assure himself that aortic incompetency alone exists, and the presystolic murmur at the apex is but a Flint phenomenon, the prognosis is decidedly more encouraging.

PTYALISM—A DANGER SIGNAL IN RENIVASCULAR DISEASE (A CONTRIBUTION TO THE CLINICAL PATHOLOGY OF PROFUSE SALIVATION)

By HEINRICH STERN

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In view of the fact that we are only now beginning to understand the physiology of the salivary processes, it is hardly surprising that so little attention has hitherto been paid to the clinical pathology of excessive salivation.

Apart from the ptyalism induced by drugs, such as mercury and pilocarpin, and by some nervous disorders, the literature contains

but very meagre and vague references regarding the excessive production of saliva in a variety of other affections.

Although it is sufficiently well known that profuse salivation is one of the possible *terminal* phenomena in some of the nephritides, practically nothing at all has been written about its occurrence in such stages of renivascular disease, when the kidneys were apparently still functioning efficiently.

In other words, we possess no data concerning the appearance of ptyalism in renivascular disease unless uremic manifestations had supervened. That ptyalism belongs by no means exclusively to the terminal syndrome of vasorenal degeneration, and that it may ensue considerable time before consummation of a fatal issue, will be shown by the following observations.

When speaking of profuse salivation or ptyalism I mean the absolute increase in the secretions of the parotid, the submaxillary, and the sublingual glands, and not the mere undue discharge of saliva from the oral cavity. However, the actual amount of saliva normally secreted during the twenty-four hours cannot be exactly stated. Various figures are but of relative value and cannot be accepted as the absolutely physiological correct standard of the amount of fluid secreted for the reasons that the activity of the salivary glands is influenced by a number of eventualities, all of which must be considered to be normal. Inasmuch as the amount of saliva may be normally so widely divergent—varying in different individuals between 600 c.c. and 1,600 c.c.—Lederer and the writer of this have defined the normal output of saliva, as follows: (Heinrich Stern and William J. Lederer, Changes in the salivary secretion effected by systemic disease, Jour. A. M. A., Dec. 10, 1904) —The normal amount of saliva is that which is secreted without artificial stimulation (by drugs or any factor that will act as an irritant to the glands directly or reflexly) without the subject being aware of its discharge, and irrespective of the quantity thus produced. While a salivary secretion of from 1,500 to 1,600 c.c. per day may therefore still be within physiological limits in certain instances, it may, undoubtedly, be of pathological occurrence in others. Exact measurements even would not assist us in diagnosing ptyalism in such cases. The only *practical* criteria of the existence of genuine ptyalism are an individual's personal sensations and obser-

ventions. We should place upon these the same reliance as upon his statements concerning the frequency of his micturitions and his estimate of the amount of urine voided. The secreting of amounts of saliva larger than usual is soon noted by the patient; his mouth is full of the saliva which he will remove by either swallowing or ejecting it; he cannot open his mouth but that some of the accumulated fluid will escape, and he cannot lie down and sleep without thoroughly wetting his pillows. A person affected with ptyalism will generally make some characteristic statement. One of my patients exclaimed that "he wished he could chew his spittle," another remarked that "he did not need any faucet water because his stomach was full of saliva," and the third expressed the opinion that "his tongue felt as if it floated around in his mouth."

Such profuse salivation, then, I have encountered in three cases of renovascular disease during the last two years. Had the salivation concurred with a diminished activity of the kidneys, the phenomenon would have been explainable, and no special attention besides the application of suitable treatment given it. As it were, however, the increased secretion of the saliva occurred first at a period when there existed no alarming symptoms on the part of the renal apparatus, when in fact the kidneys, as evidenced by metabolic and functional tests, and the determination of urinary solids, were performing their work in the same manner as months previously. It was thus fully brought home to me that the ptyalism in these cases could not have been caused by a renal insufficiency, and that the blood vessel disease itself should be held responsible for the salivary increase. The feasibility of the production of ptyalism by arterodegeneration in the vicinity of what may be considered the salivary center or centers will be discussed hereafter. Nothing speaks against the possibility; the not infrequent remittance or discontinuance of the hypersecretion during a given period may also be explained on this basis.

The excessive production of saliva may last for from two to three days, or even for from eight to ten days, and may then cease entirely for one or two weeks and reappear in a lesser degree (mostly); or the secretion may soon become less profuse, but continues in larger than normal amounts. *Paralytic phenomena were not present in any one of my three cases prior to the establishment*

of ptyalism, but they made their appearance in two of them within a few months after the hypersecretion had supervened. In the third case very frequent (often after each meal or every drink of water) projectile vomiting, and other reflex manifestations of cerebral involvement set in soon after the advent of ptyalism. Inasmuch as such definite aggravation of the patient's condition was in none of my cases noted prior to the onset of the ptyalism, I feel justified in denominating the appearance of the latter a danger signal in the course of the vascular deterioration process.

A relationship between hypersalivation and hyperhydrosis did not exist in any of my cases. While one of the patients inclined to perspire freely, the secretion of his sweat glands could neither be called profuse, nor was there any direct or inverse demonstrable analogy between the two secretions. The activity of the sweat glands of the remaining two patients seemed entirely normal. This functional independence of the two sets of glands is rather astonishing, as we have been taught that an eventual association of ptyalism and hyperhydrosis—a familiar combination in Graves' disease—should be ascribed to the selfsame disturbances of innervation.

Case I.—Male, 58 years old; consulted me first on December 24, 1912.

He complained chiefly of "asthmatic attacks," coming on after exertion. There were no nightly seizures. The amount of his twenty-four hours' urine hardly ever exceeded one liter. He did not as a rule, urinate during the night, and did not complain of frequent micturition during the day. He never had any edemas nor headaches.

The physical examination showed a rather short man weighing 140 pounds. There was some emphysema. The area of cardiac dullness was markedly increased toward the left as well as toward the right. There existed no valvular disease. The heart beats occurred in regular sequence. The first pulmonic and aortic sounds were accentuated. The systolic blood pressure was 240mm. Hg. Neurologically there were no special abnormal phenomena. There was some evidence of cerebral arteriosclerosis as, for instance, the characteristic gait. This was remarkably short, the feet were spread

widely apart and were hardly lifted from the ground when walking. His hands were often thrust out, as if he feared falling down. There were, however, no special mental symptoms.

The urine exhibited a specific gravity of 1.015; contained a small amount of serum albumin, but neither glucose, indican nor any normal constituent in excess. The sediment showed crystals of sodium oxalate, very little cellular material, and no renal epithelia or casts.

Two phloridzin tests evidenced a perfect functional activity of the kidneys.

One application of phlebotasis for three minutes relieved the attacks of cardiac dyspnea for a number of weeks.

In February, 1913, the patient first noticed a positive increase in the salivary secretion. His blood pressure had remained stationary, and the urinary findings were almost identical with those made on the occasion of his first examination. About six to seven weeks later the patient was affected with cerebral thrombosis, which was followed by hemiplegia and mild aphonic manifestations. He died in coma about two months later.

Case II.—Male, 60 years old, consulted me first in April, 1908. The patient's chief complaints were giddiness, shortness of breath on slight exertion, insomnia, inability to concentrate, loss of memory, and frequent (though small) micturitions. He had hardly ever suffered with headaches.

The physical examination showed an overnourished individual, weighing 205 pounds. There was no outspoken cardiac disease, but the heart was moderately dilated, as evinced by an X-ray examination. The second pulmonic sound was distinctly accentuated. The systolic blood pressure was 265 mm. Hg. There were no nervous symptoms, and, excepting the giddiness, there were no manifestations pointing to cerebral arteriosclerosis.

The urine exhibited a specific gravity of 1.014; was slightly alkaline, and contained a large amount of serum or lymph-albumin, but no glucose, indican, or other abnormal constituents. None of the normal urinary substances occurred in excess. The sediment showed some crystals of ammonium-magnesium phosphate, a moderate number of old leukocytes (pus corpuscles), some epithelia from

the superficial and middle layers of the bladder, no renal epithelia, no renal casts, and no oil globules.

Repeated phloridzin tests evinced a fair degree of renal efficiency.

Continued observation showed very little change in the patient's physical state, although—under treatment—the blood pressure decreased to between 160 and 190 mm. Hg., and the dyspnea disappeared to some extent, and the giddiness was lessened.

In April, 1913, the patient first drew my attention to a salivary increase. The ptyalism continued slightly diminished for nearly two weeks, reappearing on frequent occasions during the remainder of the year. Sometimes it lasted for but a day or two, on other occasions it continued for from eight to ten days. During the periods of excessive salivation the blood pressure rose never above 190 mm. Hg., and the urinary examination invariably showed an alkaline reaction, a slightly lowered specific gravity, goodly quantities of albumin, while renal elements could never be distinguished. The renal efficiency was not lowered on a single occasion.

In the early autumn of 1913 projectile vomiting made its appearance. The patient never felt nauseous, but ejected the stomach contents nearly every day, on some occasions even twice daily. At about the same time a great apathy took possession of the patient. He feared to walk alone because dizziness would suddenly and unexpectedly supervene. He was averse to show himself in the street or any public place. He died in coma in March, 1914.

Case III.—Male, 46 years old; consulted me first in May, 1913.

The patient's chief complaint, according to the family physician, was a limited pulmonary edema, appearing principally in the night after he had slept for about one hour. During the day the edema would supervene but rarely and then only after the patient had occupied the recumbent posture for some time. He also experienced shortness of breath on exertion. There also existed a mild degree of anesthesia in the skin of four fingers of his right hand, but no trophic disturbances were associated with it. The patient voided large amounts of urine at frequent intervals during the night. The night urine comprised about two-thirds of the entire twenty-four hours' output. The patient had never complained of headaches.

The physical examination revealed a much overnourished person, being 5 feet 6 inches tall, and weighing 248½ pounds. The heart, like in many obese individuals, was lying transversely in the thoracic cavity. Excepting its fatty condition, no positive evidence as to a myocardial disease could be elicited. There was no valvular disease and no irregularity of any description. The systolic blood pressure was 235 mm. Hg. The various reflexes were quite normal, and accommodation and coordination quite fair.

The renal secretion had all the characteristics of an albuminous urine, contained an occasional hyaline cast, but no renal epithelia.

The renal efficiency, tested by means of phloridzin and phenol-sulphonphthalein, was still quite fair.

Under treatment the nocturnal pulmonary edemas soon ceased, as did the attacks of dyspnea. The blood pressure fell to between 160 and 185 mm. Hg. The urine, however, continued to exhibit the very same features throughout the remainder of the patient's life.

In October 1913, the patient started to complain about the secretion of excessive amounts of saliva. The ptyalism, with brief interruptions, continued until January 1914, when the patient had an attack of cerebral embolism. In June and July 1914 ptyalism again supervened. In September 1914, the patient succumbed to a second attack of cerebral embolism.

There can be little doubt that in every one of these three cases there existed degeneration of cerebral blood vessels. The endarteritic or fibrotic process—in itself the immediate result of a mechanical irritation—may so change the course and caliber of a minute cerebral vessel that it will become a temporary or constant source of irritation to the neighboring nerve-cells or brain tissues. There is, in fact, no reason why a minute blood vessel which has undergone atheromatous or fibrotic changes could not under certain conditions act like a mechanical stimulus, i. e. by irritating the cortical substance or some portion of the medulla oblongata.

That chemical irritation of certain areas of the cortex cerebri gives rise to increased salivation is a fact that has been repeatedly demonstrated in an experimental way. Again, that excessive salivation may supervene during the uremic attack is also a fact which

may be attested to by many clinicians. Personally I have observed the appearance of profuse amounts of frothy saliva in well-nigh every one of my cases of genuine uremic convulsions. However, that the ptyalism in uremia is directly or indirectly attributable to a chemical irritation of the cerebral cortex, as Landois assumes, remains not only unproved, but contradicts the autopsy findings. This ptyalism seems to be rather the consequence of a mechanical irritation, viz., an engorged cerebral circulation or edema of the brain, to factors in other words, which are also at the bottom of other uremic manifestations.

Of course, terminal conditions as they prevail in the fully developed uremic state will not be looked for in instances of ptyalism occurring months before a fatal issue. These cases of excessive salivation must be explained as the result of vascular changes that have ensued in the immediate vicinity of the salivary secretion centers—be it the particular areas in the cerebral cortex or the nuclei of origin of the secretory fibers in the medulla oblongata, or some other location—causing therein an irritation by which the salivary glands are called into increased activity.

DIAGNOSIS OF CANCER OF THE COMMON DUCT

By WILLIAM FITCH CHENEY

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Deep and long-continued jaundice always makes a picture that none can overlook. The signs of it are so obvious that they cannot be mistaken. But when it comes to interpretation the task is not so easy. The case may be comparatively trivial, as when the cause is catarrhal inflammation of the duct's lining membrane; or on the other hand it may be hopeless for cure, as in malignant disease; and decision as to what the jaundice means, thus becomes at times one of the most serious problems in medicine.

The history of a recent patient will best present the difficulties of the situation. A man aged 62 years was seen in August, 1914, with a complaint of "biliousness" beginning about the first of June preceding. The symptoms at onset were loss of appetite, coated

tongue, nausea, headache, slight fever; then after this had persisted two or three weeks, he gradually became yellow all over his body. He had never had any pain at any time. For weeks during July and the latter part of June he vomited constantly all food, all drugs, even water; and coincidentally he lost much weight, nearly 40 lbs. in all. Ultimately the vomiting gradually grew more infrequent and when seen in the latter part of August he was retaining practically all food eaten. His main complaint then was of itching of the skin.

The previous history was of continuous good health until four years before; when he began to have attacks of "stomach trouble," occurring once in two or three months and lasting several days or a week. These attacks were characterized by severe pain, coming on rather suddenly after hearty eating, steady and continuous in character, felt in the pit of the stomach, never radiating to the back, never accompanied by vomiting, never followed by jaundice. In the intervals he had no trouble at all and enjoyed a good appetite.

Examination showed extreme yellowness of conjunctivæ, skin and visible mucous membranes. The urine was persistently as dark as porter and the feces as light as putty. The heart rate was very slow but there was no evidence of organic disease. The lungs presented no abnormality. The liver area was not increased, the lower border was not palpable, there was no rigidity of the abdominal wall along the costal margin. The spleen was not enlarged. The abdomen showed no visible or palpable abnormality. The urine, besides its very dark color, showed a trace of albumin, abundant urates, and a few fine granular casts. The blood showed only a slight secondary anemia, no leukocytosis. Stomach contents, after the Ewald test meal, gave a total acidity of 61 with free HCl 31. On inflation of the stomach, the greater curvature did not reach the navel, and the contour showed no abnormality.

This patient certainly had a chronic obstruction of his common bile duct, as shown by skin, urine and feces; and the problem remaining to be solved was the cause of the obstruction. The possibilities seemed to be very few, namely: (1) chronic catarrhal angiocholitis; (2) gall-stone blocking the lumen; (3) malignant growth, originating either in the duct itself, or in some surrounding part and pressing on the duct.

(1) As regards angiocholitis, the most formidable objection to this explanation was the long persistence of the jaundice, in spite of treatment. The onset with symptoms of acute gastroduodenitis might well make one suspect a complicating angiocholitis, when jaundice developed; but jaundice persisting for eight weeks or more, increasing rather than decreasing as time went on and not responding to any sort of medical treatment directed to a catarrhal origin, could not be attributed any longer to simple inflammatory obstruction. Catarrhal jaundice is commonly transitory and six weeks seems to be accepted as the utmost possible duration, provided proper treatment has meanwhile been adopted for relief.

(2) In favor of the theory that a gall-stone was lodged in the duct and blocking it, was the preceding history for four years of attacks which might be interpreted as biliary colic. But against this theory was the absence of pain at the outset of the present illness or at any time during its course. A gall-stone large enough to block the common duct ought to cause severe pain at the time of its escape from the gall-bladder through the cystic duct; and subsequently from time to time as renewed efforts were made to expel it. Furthermore, the diagnostic history of gall-stone lodged in the common duct is of recurring paroxysms of chill, fever and sweat resembling malarial fever but really due to sepsis; and no such attacks had ever occurred. The absence of any palpable mass in the gall-bladder region is not against the diagnosis of gall-stones, for frequently no mass can be felt and no tenderness elicited, even though operation subsequently shows many gall-stones present. The old law is that a stone in the common duct does not give rise to enlarged gall-bladder, because the gall-bladder itself is usually atrophic and thick-walled from long-standing cholecystitis; while a growth involving the duct does cause distention of the gall-bladder by obstructed bile. But this law has many exceptions, and in this case at any rate did not prove a good working rule.

(3) The presence of a malignant growth involving the common duct seemed thus by exclusion to become the inevitable explanation of the chronic jaundice. The man's age, 62; his great loss in weight, approximately 40 lbs., in three months' illness; the painless course of his disease; the persistence and gradual increase in the obstruction, in spite of all remedies to relieve it; all spoke for

the presence of a neoplasm. It was recognized that this growth might really be situated in the duodenum, about the papilla of Vater; but the absence of any palpable tumor make it likely that the mass was very small. The theory of a primary growth outside the duct, pressing upon it, was eliminated by the lack of any evidence of disease in neighboring organs. The stomach showed no sign of pyloric neoplasm, by physical examination or by analysis of gastric contents; and the tumor must be at the pyloric end in order to cause pressure on the common duct. The liver was not enlarged, its lower border was not palpable nor tender, and it seemed most unlikely that a neoplasm in its substance could exist of sufficient size to obstruct the duct by pressure. The head of the pancreas, if it contained a growth, large enough to cause the obstruction, should also be palpable through the abdominal wall; and the urine should show sugar.

Thus by a gradual process of observation and investigation to elicit facts, and then by sifting and interpretation of these facts, the conclusion was at last definitely reached that this patient's jaundice was due to a neoplasm of the common bile duct. He was operated upon early in September. A growth was found involving the entire common duct and confined to the duct. The duodenum was not involved. The gall-bladder was apparently normal and contained no stones. A cholecyst-duodenostomy was done, but the patient died a few days later.

It will thus be seen that cancer of the common duct is one condition that still offers no short cut to diagnosis. X-ray examination will not show it; and no laboratory aid alone settles the matter. The decision in such a case, therefore, requires an expenditure of time for investigation and of energy for thought, without which any conclusion reached is most apt to be wrong.

AN AID IN THE EARLY DIAGNOSIS OF PULMONARY TUBERCULOSIS

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Impressed by the importance of the recognition of pulmonary tuberculosis in its earliest incipency (pre-tuberculous stage), ob-

servers have described, from time to time, signs, or methods of obtaining signs, intended to facilitate this early diagnosis. Prominent among these are the apical percussion methods of Goldscheider and Krönig, the muscular spasm phenomenon described by Pottinger, acromial lagging, pupillary inequalities, myoidema and so on. To these may be added the employment of acromion auscultation recommended by Abrahams (Archives of Diagnosis, April, 1913), Magida (N. Y. Med. Jour. XCVIII, 1913, p. 1261), and Bryant (Jour. A. M. A., LXII, 1914, p. 1635).

Fine râles, constantly present over an apex and *properly interpreted*, in patients whose anamnesis speaks for a tuberculosis, are, of course, of immeasurable significance, provided non-tuberculous causes of these adventitious sounds, such as nasal obstruction, thoracic deformities, cardiac lesions and apical atelectasis (occurring particularly in slightly built women who have never learned to aerate their apices), are absent. To promote the production of these râles, various means have been advocated; a deep inspiration, sharp coughing, a deep inspiration after the patient has counted aloud as long as possible in a single breath (Sahli, Untersuchungs-methoden, 5 Aufl. I, 307.), the exhibition of potassium iodide, etc.

As another aid in the eliciting of these râles, the writer (and others to whom he has communicated the finding) has had success with what may be termed the *whispered-voice method*. It consists in having the patient whisper in an emphatic way, repeating "One, two, three" a number of times, following which he is instructed to inspire deeply. It is a frequent observation that when the other above mentioned methods fail, this procedure is successful in bringing out the significant apical râles.

The explanation of the phenomenon is not clear though several possibilities suggest themselves. Often the act of whispering is performed in an exaggerated way—with an explosive thrust as it were—greatly raising the intrapulmonary pressure (in a way analogous to the Valsalva method), thus forcing the sticky alveolar surfaces apart. Or, perhaps, the observation is based upon a fact well-known to singers, namely, that whispering causes the accumulation of mucus in the respiratory passages.

THE RÖNTGEN EXAMINATION OF THE
GALL-BLADDER

By WILLIAM H. STEWART

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The generally accepted conclusion to-day, that the röntgen examination will not demonstrate the presence of cholelithiasis, has led the medical profession to ignore the valuable aid that can be given by this agent in the diagnosis of this condition.

Recent advances in the technic of examinations of the gall-bladder region have enabled the röntgenologist to give accurate information in a number of favorable cases, although we have not as yet reached the stage where a negative diagnosis can be made with any degree of certainty. Our positive cases, however, have now reached such a percentage that we are justified in recommending the röntgen examination in all cases suspicious of gall-stones.

That the success of demonstrating cholelithiasis depends upon the amount of lime salts present in the calculi is generally recognized. A pure cholesterin stone will seldom cast a shadow except in a very favorable subject with thin gall-bladder walls.

It has been asserted that calcium carbonate is present more frequently in gall-stones than is generally appreciated. This statement inspired me to devote more attention to the development of a technic which would overcome many of the difficulties heretofore met with. The latter have been largely due to two factors, namely, (1) that up to the present time sufficient emphasis has not been laid upon the importance of the work, in consequence of which it was not deemed worth while to subject the patients to such an examination, and, (2) that the röntgenologist did not make sufficient effort to concentrate his attention on the gall-bladder region, and had been content with the occasionally showing of gall-stones, mostly coincident with a gastrointestinal examination, which, in fact, had such a high percentage of lime salts that they were as easily demonstrable as ordinary renal calculi.

It is not the purpose of this paper to deal with such cases.

The flattering results that I have had are entirely due to a study of the faint and ill-defined shadows, often requiring oblique illumination with northern light to interpret.

In addition to the actual demonstration of gall-stones, it is possible to distinguish the gall-bladder, especially if the walls are much thickened, lying under the free border of the liver in the region of the twelfth rib. Special skill is required in the reading of such plates, and it is frequently impossible to demonstrate the presence of gall-stones to the satisfaction of the attendant physician or surgeon; this was the case in a number of instances when operative findings verified the interpretation. Shadows of this kind are completely lost in reproductions (such as in prints and lantern slides), therefore it is absolutely necessary to study the original plates.

The röntgen examination of the gall-bladder region is not limited to demonstrating the presence of cholelithiasis. Most valuable information can be obtained, after the administration of a bismuth meal, as to the presence of adhesions in and around the gall-bladder and adjacent viscera. Adhesions are recognized by fixation under manipulation and peculiar persistent shadows indicating a marked displacement of the prepyloric region of the stomach to the right with a sharp angulation of the first portion of the duodenum which hugs closely to the undersurface of the liver; these adhesions in the vast majority of cases are caused by pericholecystitis.

TECHNIC

1. *Preparation of the Patient.*—On the evening before the day of the examination, the patient should be given a free dose of saline cathartic; this is preferable to oil, as that very intestinal gas which salines seem to form is of an advantage in the examination of the gall-bladder. The distension of the intestines, especially at the hepatic flexure and first portion of the transverse colon, which is reproduced on our plates as dark shadows in contrast to the light ones of liver and gall-bladder, often aid in the interpretation of lesions in the right upper abdominal quadrant. The following morning (the day of the examination) about 7:00 o'clock, the patient is allowed a light breakfast. During the morning colon

irrigations should be given until the return is clear and the abdomen relaxed. The patient should appear for examination at about 1:00 p. m. with an empty stomach.

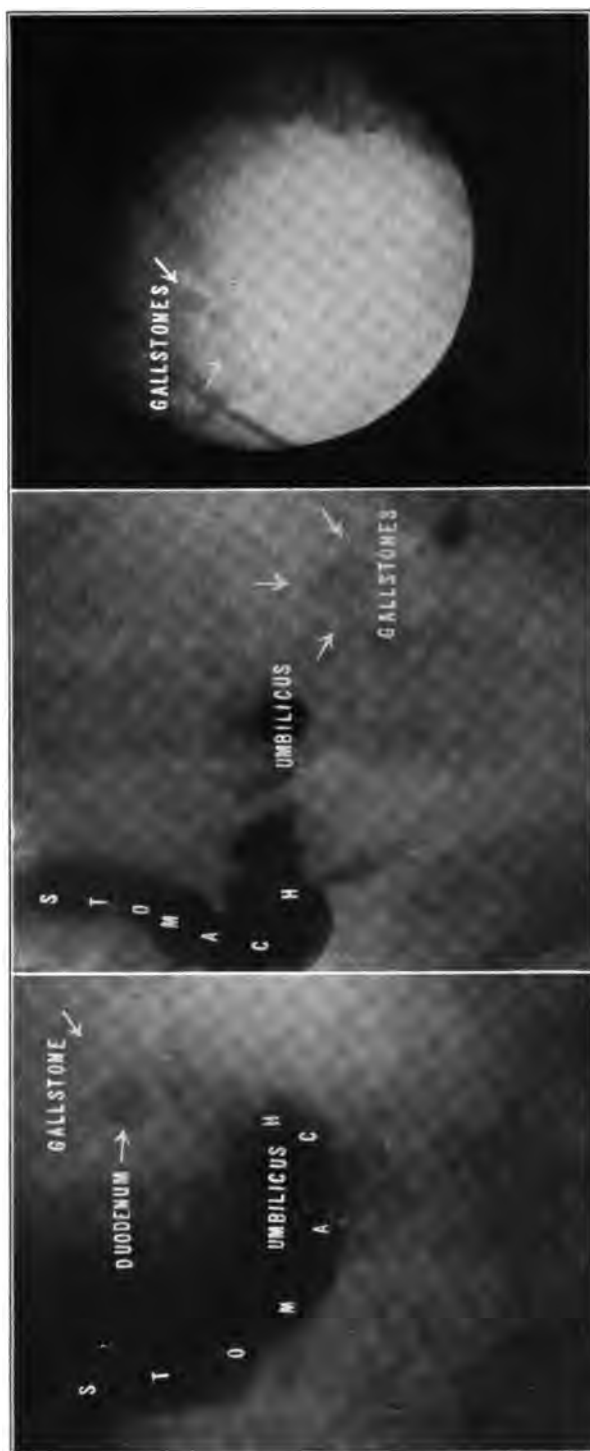
2. *Examination.* Much discussion has been occasioned by the question of the best position to place the patient in for the bringing out of the gall-bladder region. While my experience does not show the necessity of any special posture, the best results have been obtained with the patient lying on the abdomen with his chest slightly raised; this seems to bring the upper right quadrant more directly in contact with the plate and has a tendency to spread the anterior ribs.

It is best to use a small diaphragm with a cone having a diameter of about two inches. The central ray should be centered just below the twelfth rib on the right side, at an angle of about eighty degrees to the plate. The most important point in this portion of the technic is compression; it is only by the aid of pressure and immobilization that the finer shadows are brought out; a small, round worsted bag is placed under the sharp edge of the cone and compression made until the patient complains.

Intensifying screens should never be used in the direct examination of the gall-bladder; the unscreened plates give much clearer details and gall-stones can readily be recognized on these where screened plates fail to reveal their presence.

It is best to make at least six röntgenograms using three tubes of varying penetration; the medium soft tubes usually give the most satisfactory plates. The exposure should be as short as possible while the patient is in full inspiration—full inflation of the lungs has a tendency to open the free anterior ribs and push the gall-bladder downward, which is most desirable. The development of the plates is very important. They should be varied in density from light, medium-light to medium-dark. No attempt should be made to read the plates until they are thoroughly dry; then they should be studied under a variety of conditions using direct, indirect and oblique illumination; often examination under a northern light will bring out the clearest detail.

If these röntgenograms are negative, the patient should be re-examined. After the administration of $2\frac{1}{2}$ ounces of bismuth subcarbonate thoroughly mixed in a pint of thick buttermilk, he is



THE RÖNTGEN EXAMINATION OF THE GALL-BLADDER

William H. Stewart



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placed in the erect position and examined fluoroscopically; the important point to observe in this posture is the presence of fixation, under manipulation, of the prepyloric region of the stomach and first portion of the duodenum, with the location of the same. The patient is then placed in the prone position and about six plates are made from behind-forward, using the intensifying screen with very short exposure—usually about $\frac{1}{4}$ second—this will give the most accurate information as to the exact location of the pars pylorica and the presence of angulation of the first portion of the duodenum. If, under the fluoroscope, with manipulation, the pylorus seems fixed and the röntgenograms invariably show the pars pylorica well over to the right, combined with an angulation of the duodenum and “liver hugging,” we may be fairly confident that adhesions exist, probably from an attack of pericholecystitis.

Certain cases require inflation of the stomach and colon with gas to bring out the gall-bladder and liver outline; this procedure, however, has not been altogether satisfactory in my hands. Many obese subjects, however, require such measures to obtain the information required.

While the usual shadow of the gall-stone shows a light central area composed of cholesterin with a dark periphery of calcium salts, it is best not to depend entirely on such characteristics as frequently gall-stones show as solid bodies similar to the appearance of renal calculi.

The most common causes for confusion in the interpretation of gall-stone shadows are those cast by renal calculi, calcified costal cartilages and mesenteric glands. Renal calculi lack the characteristic form of gall-stones and give a dense shadow which has a fixed relation to the kidney; to ascertain this condition it may be necessary to make a stereoscopic examination;—as a rule the renal calculi are more clearly shown by placing the plate at the back and directing the ray from before-backward. I have had gall-stone cases, however, showing a large round shadow quite dense, appearing most clearly in the plates taken in the usual position for examination of the kidneys, where it was difficult to differentiate between a renal calculus and a gall-stone. Such confusion is readily accounted for when operative measures reveal a greatly distended gall-bladder which lies well back containing a gall-stone in a sac-

culated posterior portion of the gall-bladder. In the interpretation of these, the clinical picture and the laboratory reports must be taken into consideration.

In my experience, calcified costal cartilages are frequently most puzzling to differentiate from gall-stones. When such a confusion arises I usually ask for a stereo-röntgenographic re-examination; this, combined with the fact that shadows of calcareous matter appear bilaterally in the line of the anterior ribs, will as a rule clear up the case.

Calcified mesenteric glands may be mistaken for gall-stones; they are, however, usually irregular in shape, dense, of varying size and not faucetted; if careful search is made, they are often found in duplicate outside of the gall-bladder region; a stereoscopic examination will aid in the differentiation.

The reproductions illustrating this article are necessarily limited to those cases having a large percentage of lime salts in the stones and which are not difficult to demonstrate with ordinary technic.

GALL-STONES EJECTED THROUGH THE MOUTH

By ALBRO R. CARMAN

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In the literature at my disposal nothing is mentioned that gall-stones may be ejected through the mouth. An inquiry among a number of medical friends showed clearly that none of them had ever heard of a case in which the gall-stones were actually vomited by the patient. The following case may therefore prove interesting to a wider circle.

Maggie F., aged 45 years, born in Ireland, unmarried, had an attack of acute inflammatory rheumatism twenty years ago. In March, 1913, she had another attack of the same affection which lasted six weeks. This last attack as well as the first one had apparently run without any complications. Singularly the heart had remained unaffected. Outside of some attacks of migraine and of what she described as "bilious fever" she had never experienced any other illness.

On February 11, 1914, she was suffering with an acute gall-stone colic. The colicky condition lasted from Sunday morning

until Tuesday morning. She was then well jaundiced. A few days afterward the patient was again able to attend to her work.

On March 15, 1914, she had apparently an acute attack of indigestion. She vomited very frequently for about four days. Each time she vomited she brought up several gall-stones, varying in size from that of a pea to a small walnut. The total number of the gall-stones ejected through the oral cavity could not be ascertained by me, but I have collected more than thirty of them. Since this last seizure the patient has been in excellent health. The gall-stones, according to an examination made by Dr. Heinrich Stern, are composed of biliary pigments to the greater part. They possess a rather high density, being considerably heavier than water. They are brown in color, exhibiting greenish marmoration.

POSTURE AND KIDNEY DISEASE

By SIGMUND EPSTEIN

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A number of queer ideas as to the effects of posture on the normal human body have gained currency. Medical men give too much credence to the theory that certain attitudes assumed while an individual is at work cause fixed deformities of the trunk and of the extremities. The laity associate the symptom of backache and kidney disease so closely, that the family consultant is inclined to belittle such illogical references, calling any chronic backache "a touch of rheumatism."

The back is a fruitful field for the differentiation of postural and kidney conditions, and really deserves more attention than the internist usually gives to it. A consistent logical diagnosis, backed up by a little patient attempt at observation, should not be outflanked by a "guesstimate." Physicians of our own time are not any more careless than their predecessors of biblical times, and the writer has no intention of censuring them as the Bible did: "And had suffered many things of many physicians, and had spent all she had, and was nothing bettered, but rather grew worse."

Indirectly, posture has some effect upon kidney affections; trades requiring long standing can affect the movability of the kidney. Thin, enteroptotic working women, especially those who have gone through one or more pregnancies, are prone to this; weakness and fatigue make for round shoulders, and a lordotic spine, perhaps a flat back is the result. Goldthwait believes that next in order is a forcing downward and forward of many of the abdominal viscera, an undue absorption of the perirenal fat, and thus a posture assumed in certain occupations indirectly leads to a loosening of the moorings of the kidney. For such conditions massage, exercise, and appropriate support for the abdomen and spine are recommended. No occupation seems to be a direct causative factor in kidney affections, with the exception of overdistension of the bladder in engineers and motormen, which is due to their inability to respond to the calls of nature for long periods. Amyloid changes in the kidney, so commonly met with in cooks and waiters, are the result of old, indurated, varicose ulcers.

When considering pain in the back as a symptom of many conditions consequent to spinal or renal disease, it might be well to merely mention some types that must be taken into account when any lesion is found near the dorso-lumbar region. Such are neurasthenia, muscular rheumatism, spinal neuralgia, the nephritides, surgical kidney, cystitis, vesical and renal calculi; their differential diagnosis can be found in text-books. Sometimes, however, we encounter backaches that are unusual.

I was asked to see a well-nourished boy of twelve years who complained of backache and pains in the feet; he presented tender spinal and calf muscles; his eyelids were quite puffy, and there were other symptoms that indicated either spinal caries or nephritis. Careful questioning and finding of an eosinophilia of 21 per cent. elicited infection with *Trichina spiralis*. The boy soon recovered, under the administration of intestinal antiseptics.

In young persons the relation of scoliosis and lordosis to albuminuria, familiarly grouped under the heading of orthostatic albuminuria, is very interesting. The many theories advanced as explanations for the appearance and disappearance of albuminuria, resulting from long standing, full meals, in conjunction with a minimum of exercise, show that the subject has engaged the attention

of a number of competent observers. Scoliotic patients, with transient albuminuria, whom I have watched, did not make it difficult to accept the theory of its mechanical causation. The twisting of the vertebræ and the ribs must beget a lengthening and tortuosity of the renal vessels, especially the renal vein. Experiments have proven that interference with the blood pressure in the renal vein leads to the finding of albumin in the urine: anatomical changes can produce the same in the period of rapid growth. If the patient is anemic, or constipated, or wears improperly adjusted corsets, we can readily see how the delicate balance of metabolic processes can be perverted. Such patients complain of backache, constant lassitude, inability to concentrate, some present symptoms of nervousness, and all show symptoms of a constitutional lack of development.

Bass and Wessler describe a characteristic attitude, studied in a series of 29 dispensary cases: "The shoulders are rounded, scapulæ are prominent, chests are long and narrow, the abdomen protrudes, especially in the lower half, and the spine shows a distinct lumbar lordosis. The extremities are cold, clammy, cyanotic, while the general body surface is pale, though the hemoglobin count is normal. Mentally the children are bright and eager to learn: the disposition is, however, whimsical, and they are given to fits of anger, so that in many cases patients come for nervousness."

Jehle believes that the albumin appears in the urine as a result of the pressure of the prominent vertebræ on the renal veins. He has shown that when children are placed in the kneeling posture, so that the dorsal and lumbar spine sags,—albumin and even casts and red blood corpuscles may appear in a previously normal urine. A course of exercises, breathing gymnastics, resistance movements and massage will dispel the gloom of suspected kidney disease, clear up the albumin, and increase the body weight. These children of neurotic parents, subject to vasomotor disturbances of the extremities, who are burdens to their neighbors,—require the coöperation and attention of an intelligent, trained watcher, rather than a masseur, and much depends on the carrying out of small details. Sometimes the albumin disappears when a plaster jacket is applied. It is gratifying to be able to reassure such families that the prognosis is

good, the albuminuria having no serious effect on the duration of life.

The lumbar spine offers many wit-sharpening opportunities for the painstaking internist. In children, early Pott's disease is detected with difficulty, on account of the deep situation of the vertebræ. Muscular spasm and rigidity must be carefully ascertained while the patient is completely nude and lying prone. In adults, however, we are assisted by a more exact localization of painful areas, and a knowledge of the conditions that modify symptoms, such as change of attitude, rest, the influence of jarring, etc., I have recently seen two instances in out-of-town patients in whom typical knuckling of the spine had been overlooked; they had both been treated for inexcusably long periods for kidney trouble. As soon as a spinal apparatus was applied both were enabled to attend to business. The diagnosis of sacro-lumbar disease in adults presents great difficulty to the uninitiated. A man complains of "lumbago,"—he is considerably worried,—he finds that he passes, perhaps, more urine; the laboratory reports show an excess of phosphates, or even a faint trace of albumin; and presto! the case is stamped nephritis. Valuable time is lost during the earlier stages of bone destruction, when proper treatment would have prevented profound disability. More of these cases should be studied by means of the test for psoas spasm, by means of the sacro-iliac-gluteal sign and by the X-ray. There may be three eventualities concerning the relation of Pott's disease to kidney function: (1) It may be a predisposing cause of nephritis; (2) it may lead to amyloid degeneration, and (3) as to its pressure effects.

1. Kyphotics, according to Neidert, can expect to attain an average of 49½ years: they are predisposed readily to kidney degeneration.

2. Amyloid disease of the kidney can be suspected in hump-backed individuals when painless enlargements of the liver and spleen arise, in association with albuminuria and extreme paleness of the skin and mucous membranes. The beginning of the condition is heralded by a rapid increase of the marasmus already existing. The urine shows the picture of a chronic parenchymatous nephritis. In chronic suppurative conditions that are non-tuberculous, amyloid swellings and albuminuria seem to disappear in some cases after operation: in my experience with old tuberculous hips and spines,

however, operation apparently has hastened the fatal termination, due to increase of the amyloid process. Generally speaking, amyloid liver and spleen involvement are less frequently met with now than 15 years ago,—but adults with progressive erosion of the spine, especially when complicated with abscesses, or intestinal tuberculosis or peritonitis, inevitably succumb to the effects of amyloid disease.

3. A vertebral buckling at the level of the renal vessels can cause an appreciable amount of pressure upon the renal circulation, increased when extensive adhesions are formed around the spine, and intensified when a psoas abscess begins its course in the sheath of the psoas muscle, along the sides of the lumbar vertebræ.

Diabetes is frequently associated with neuritis and neuralgic backache, but I have recently seen a woman of 56, with an old diabetes, who acquired a condition of lumbo-sacral displacement, exactly like a spondylolisthesis. This was associated with painful attacks of great severity, and a spinal brace afforded temporary relief. Here the lesion favored the diagnosis of a form of spinal softening of diabetic origin.

The differential diagnosis of several conditions that present points of similarity may prove of value:

Ureteral colic and spondylitis deformans with nerve pressure, have several points in common, but the latter condition is remittent or chronic, pain follows the course of a definite nerve, is accompanied with spinal stiffness. Good X-ray plates reveal ossified intervertebral ligaments; when support is applied, pain gives way to comfort. During the course of certain cases of gonorrheal urethritis, a backache is encountered that can be puzzling: if it be from a gonorrheal pyelitis, which is not common, the urethral discharge helps to still further befog the laboratory report. The more frequent complication is a mild spondylarthritis of gonorrheal origin; it is diagnosed by a rigidity of the back, tender points along the spinous processes, while the possibility of other joints being affected must not be overlooked.

THE IMMEDIATE DIAGNOSIS OF BIRTH CANAL
LACERATIONSBy W. P. MANTON
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In these days of larger venture and achievement, when the seemingly impossible becomes at once the commonplace, it happens that the minor details of existence, the small and inconspicuous things upon which normal life and happiness really hinge, are obscured by the glamor of the often unattainable. Thus too often it is forgotten that "one of the essentials of equipment for great affairs is ability to observe accurately the little no less than the large," and the average practitioner continues to grasp at the shadow, neglecting the substance.

It is quite essential that one should be familiar with advances in medicine, surgery and the specialties, but it is of far greater importance that we should be alert to recognize and control the "little foxes" of practice which are of daily occurrence and which, unobserved and neglected, "spoil the grapes" of reputation and success.

Among the commoner occurrences which are thus constantly overlooked are injuries to the vaginal tract incident to childbirth. Nowadays one rarely hears the physician boast that he never has a perineal tear in his obstetric practice, for too much has been written and said on the subject to make such expression wise or tactful; but in spite of the silence on this point it is probable that the occurrence of the lesion is quite as frequent and as constantly escapes observation as it did formerly. The number of sufferers who frequent the consulting rooms of the gynecological specialist seeking relief from the sequelæ of perineal defects are active witnesses to the fact that some one has blundered; in spite of the emphatic teachings of modern midwifery, neglected perineal lacerations still remain the opprobrium of obstetrics.

A better knowledge of the management of labor and so-called perineal support have done away to a large extent with the obvious median perineal tear, so conspicuously figured in the older textbooks, but the essential part of the pelvic floor continues, and probably always will continue, to be more or less injured during childbirth.

In its descent through the parturient canal the fetal head distends the vaginal tube, often beyond the stretching limit, so that as the lateral walls unfold a point may be reached when the capacity for distension attained, in the presence of even ordinary pains something must give way to permit of further progress.

Most frequently the weak point is to be found in the lateral sulci, which, as labor advances, tear on one side or the other, and the advancing head rolling the relaxed tissues before it, peels off fascia and mucosa at the muco-cutaneous junction. On inspection such a perineal injury is not always evident because the damage lies behind the obstetric perineal (skin) which appears intact. The tight introitus gives way under pressure or from extension of the sulcal tear above, but the more elastic skin stretches over the escaping head and superficially at least remains unimpaired.

The laceration, however, is there, and its effects begin to show when the woman gets about, in a weakening of the pelvic floor and a subsequent train of symptoms for the relief of which resort is finally had to surgery.

Why should these unfortunate patients be allowed to suffer and require a secondary operation when prophylaxis and remedy lie ready at hand? The answer can be found only in a lack of diagnostic acumen, carelessness and the absence of surgical ability and technic.

It is now well understood, a fact which I insisted on as long ago as 1892, that of all the structures of the pelvic floor, the levator ani is the most important supporting portion of the anatomical ensemble, and upon the integrity of this muscle depends the normal physiological status of the superimposed pelvic viscera. It is therefore of prime importance that, following labor, this muscle should retain the same harmonious relationship with the surrounding parts, as before delivery. Injuries to this muscle must, therefore be recognized early and necessary repairs undertaken before the patient assumes the upright position, when gravity and intra-abdominal pressure begin their invidious action in the production of displacements and pathological sequelæ.

The diagnosis of birth canal injuries presents no difficulties and the determination of their presence requires little skill and but a moment of time; the evils which may result from the neglect of

their discovery should stamp the accoucheur culpable and untrustworthy.

Following delivery, the patient's toilette completed, the physician should examine the vaginal tract from cervical junction to introitus. With the parts clean and sterile, and the hand protected by a sterile rubber glove, two fingers are carried into the vagina and the walls on either side carefully palpated. If lacerations exist, the difference in feel between the intact vaginal wall and the open wound will at once become apparent, while in the downward sweep of the fingers any excavation behind the perineal skin is readily detected. This done, the forefinger should be passed through the anus and the thumb into the vagina and the thickness of the intervening tissues carefully gauged. Only by so doing can an accurate knowledge of the damage existing be obtained.

Lacerations of the nature described should never be left to nature to remedy, nor, except under certain conditions, deferred for secondary operation. They should be repaired at once. The immediate repair is safe and rational. In sewing up, the utmost care should be observed in bringing part to part and tissue to tissue; en masse suturing is reprehensible. While, as already stated, the uniting of mucosa and fascia is of great importance, if subsequent disasters are to be averted the ruptured fibers of the levator ani must be carefully drawn together and stitched. As, following delivery, the muscle often retracts and lies deeply to the pelvic sides, in suturing, the fibers having been drawn out toward the median line by forceps, the needle must be passed well downward and outward laterally.

The physician who takes a woman safely through the perils and dangers of childbirth and discharges her at the end anatomically and physically sound is entitled to quite as much honor and credit as the surgeon who relieves his patient's suffering by a gastro-enterostomy or the successful treatment of a compound comminuted fracture. There are few, however, whom the eclat of the latter will not blind to the merits of the former.

In the above nothing new is offered; it is a rehearsal of time-honored teaching, which experience shows still demands continued reiteration.

SYMPTOMS AND SIGNS IN THE DIAGNOSIS OF
DISEASES OF THE CHEST

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In the course of examination of a large number of patients with various chest diseases, bearing constantly in mind pulmonary tuberculosis, I was impressed with the great diversity of complaints which are at times confusing and misleading. The patients' history may be so distorted that, unless the physician is on his guard and thoroughly examines every patient, many diseases of the chest will never be properly diagnosed.

Based on their complaints, patients with thoracic diseases may be divided into four groups.

- (1). Patients who complain of symptoms too typical of pulmonary tuberculosis just as if they had them copied from a text-book.
- (2). Patients who complain of practically nothing. They wish to be examined because they are somewhat tired and do not feel just right for a week or two.
- (3). Patients who complain of being ill for some time with symptoms strongly suggestive of tuberculosis.
- (4). Patients who complain of nothing else, but persistent cough and dyspnea on exertion.

Patients of the first group usually come to the physician with a ready-made diagnosis of consumption. They know everything about tuberculosis, including the pulse-rate, afternoon temperature and night sweats. They had been to many physicians and dispensaries and had their troubles diagnosed as consumption or "a touch of consumption." On repeated careful physical examination one finds their lungs in perfect condition, and there is practically nothing the matter with them, except that they suffer from consumption literature. They have read every circular and pamphlet on tuberculosis and have found themselves suffering exactly from all the symptoms described in the literature.

It is the most difficult thing to convince these patients that they are merely affected with consumption literature.

Patients of the second group have very little to say about themselves. Everything seems to be normal, but they want to be sure that there is nothing wrong with them. These patients hardly receive any serious attention in private or dispensary practice. They are the most neglected class of patients. I have seen a number of them who have been to many physicians and have never had the benefit of a proper physical examination. All they get is a friendly advice, or a little medicine, or both. And yet I have found many of them affected with incipient or moderately advanced pulmonary tuberculosis.

Patients of the third group look and feel sick. While they all fear that they have consumption, and some of them do have pulmonary tuberculosis, many of them suffer from chronic bronchitis, bronchiectasis, chronic empyema or chronic pleuritic adhesions. Some of these chronic cases go around for years without being correctly diagnosed or properly treated.

Patients of the fourth group consult the physician because of the constant cough and shortness of breath. They are usually people past middle life unable to walk more than a few blocks without getting out of breath. They also find it difficult to sleep in a recumbent position. These cases are usually diagnosed as chronic bronchitis and asthma, and are treated with all kinds of expectorants and syrups. As a rule the majority of them suffer from cardiac insufficiency due to myocarditis or from cardiovascular and renal diseases. A few of these patients I have found suffering from thoracic aneurysm.

Diagnosis is a fine art, and in order to make the art perfect and arrive at an accurate understanding of a case, the physician must have its complete history, together with the clinical, physical and some laboratory findings. With these four factors he has got to work like the artist with his tools. The clinical, physical and laboratory findings are beyond the control of the patient. He cannot add, subtract or alter. But for the history the physician must have the patient's coöperation. Much depends on the intelligence and the sincerity of the patient. Some patients will answer all questions in the affirmative, others will deny everything, while still others will tell their tale in an incoördinate, confusing way.

The physician must study all phases of the history and give to every phase its proper place and its deserved credit. A straight reliable history followed by a careful examination will lead him to the right diagnosis and the proper treatment.

The following four brief cases are given as representing the average case of each group:

Case I.—A young man, 26 years of age, single, clerk. Family and past history unimportant. Consulted me not for a diagnosis or treatment, but wanted to know whether or not he had a chance to get well in New York, or if he were compelled to go to Colorado. He was seen by several physicians before, and the diagnosis varied from consumption to "a touch of consumption." He complained of almost everything suggestive of tuberculosis, but he looked too well for so many complaints.

On repeated careful examinations I convinced myself that there was nothing wrong with him. Several sputum examinations were negative. He was proud of the fact that he could use a thermometer and knew all the signs and symptoms of tuberculosis. This knowledge he acquired through reading circulars and pamphlets on tuberculosis, and his troubles began with the reading of this consumption literature.

Case II.—A young man, 20 years of age, single, plumber's helper. Family history negative. Had typhoid about six years ago. Used whiskey and beer rather excessively. Was in the habit of staying out late at night.

For the last three or four months he had not been feeling as well as usual. Had no inclination to work. No cough, hemoptysis or night sweats; no chills or fever. Did not think he lost any weight. Appetite fair, bowels regular. He had been to some physicians and everywhere he received plenty of good advice but no careful examination and no diagnosis.

On examining this young man's lungs I found his right apex affected with tuberculosis; sputum positive.

Case III.—A man, 35 years of age, married, tailor. Doubtful family history and negative past history. His troubles began about eighteen months before he came under my observation, when he was struck by a trolley car, and was taken to the hospital, where they found several ribs on his left side broken. After three weeks

he was discharged. He felt fairly well for several weeks, but then began to have pains in the injured side with cough and occasional chills and fever. During these eighteen months he was ill most of the time. There was almost constant cough, profuse expectoration, sweating and loss of weight.

He was seen by several physicians and a diagnosis of tuberculosis was made. He was sent to the country a few times, where he temporarily improved.

When he consulted me he looked ill and had almost constant cough and fetid expectoration. Physical examination revealed signs of a possible chronic empyema. With this diagnosis I sent him to the hospital, where it was substantiated by operation.

Case IV.—A man, 58 years of age, married, tailor. Nothing of importance in his family history. He was never sick before. For the last year he is short of breath. Easily tired out on slight exertion or walking. Cannot sleep well in a recumbent position. Coughs a little most of the time. He had been treated for chronic bronchitis and asthma. Examination showed an obese patient, whose heart was enlarged, with weak sounds and no murmurs. Pulse was slightly irregular. Blood pressure, systolic was 130. The lungs were negative except for occasional râles. The liver was enlarged. The urine showed a trace of albumin and no casts.

The diagnosis of this case seemed to be chronic fatty myocarditis or fatty myocardial degeneration.

DIAGNOSIS OF CARCINOMA

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(Concluded)

In 1889, Müller suggested that malignant tumors contain one or more proteolytic enzymes. This was confirmed by Emerson in 1902 and Fischer in 1908. Since then, various investigators have shown that cancerous tumors elaborate a certain enzyme which exhibits strong proteolytic powers and which is capable of converting proteins as well as simple peptides into amino acids. Although benign tumors as well as other somatic tissues possess similar proper-

ties, their peptide cleaving powers are rather weak—they never equal the powerful peptidolytic action of malignant growths.

Neubauer and Fischer found that there exists in cancerous stomach contents a ferment that will (contrary to pepsin) split glycyl-tryptophan. The ferment is destroyed by an acidity of 0.36 per cent. hydrochloric acid. They made use of the presence of this ferment in diagnosing cancer of the stomach. The test (glycyl-tryptophan reaction of Neubaur and Fischer) which they recommend is as follows:*

An Ewald test breakfast is given and is extracted in 30 to 45 minutes; the extracted gastric contents are filtered. Glycyl-tryptophan is treated with some of the filtrate. The bottle containing the mixture is placed in a thermostat for 24 hours. At the expiration of that period the contents are tested for the presence of tryptophan. This is done as follows: About 3-4 c.c. of the contents of the bottle are removed with a pipette from underneath the layer of toluol and placed in a test tube. A few drops of a 3 per cent. acetic acid solution are added. Saturated aqueous solution of bromine is then added from a pipette, drop by drop, to the stomach contents in the test tube, until a reddish violet color appears. The appearance of this color, at times rose red, shows the presence of tryptophan and the test is positive. Care must be exercised in performing this test. Instead of bromine solution, we may use bromine vapors.

According to Neubauer and Fischer, there are quite a number of fallacies that may destroy the value of the test unless this be carefully performed. These errors are related chiefly to the presence of substances which decompose or inhibit the decomposition of, the polypeptides. These are: Vomitus, bile, blood, too much gastric acidity, and bacteria.

Weinstein modified the Neubauer and Fischer test in the following way: Four or five hours after a regular dinner, some stomach contents are secured, filtered and tested with bromine water for tryptophan. If present, reaction is positive. If absent, some of the filtrate transferred to a stoppered bottle and treated with a little toluol, or better still without a preservative, is put in the thermostat and tested again for tryptophan 24 to 48 hours later. Although the reaction very often develops at room temperature, the mixture should be kept in a thermostat for the period stated.

Weinstein was convinced that the glycyl-tryptophan test is a valuable sign in the diagnosis of cancer. Neubauer and Fischer applied their method to a number of carcinomatous and non-carcinomatous cases with the following results: 4 normal cases reacted negatively; 10 cases of gastric ulcer reacted negatively; 12 other

*Weinstein: Jour. A. M. A., 1910, lv, p. 1085.

cases of gastric disease other than cancer reacted negatively; of 19 cases of positive gastric carcinoma, 17 reacted positively. From these results they are convinced of the efficiency of their method. Hall and Williamson conclude from their investigations of the glycyltryptophan reaction that "until a large number of results are accumulated, we cannot say what is the value of this reaction, but the guidance we have so far obtained is striking." Lyle and Kober reported their results of their study of this test as applied to 20 cases in the following words: "Our results with this test have been satisfactory. A repeated negative reaction is very valuable. When the test is positive, a regurgitation of trypsin must be thoroughly investigated." Pechstein also reported favorable results with this test. Hirschberg basing his conclusions on one cancer case, reports that the Neubauer-Fischer reaction is unreliable, whereas the tryptophan reaction of Weinstein gives very good results. Breisacher, however, demonstrated that only 34 per cent. of the known cancer cases react positively to this test. Smithies, on the contrary, is quite convinced of the advantage of this method (1912).

Friedman found that while the glycyl-tryptophan reaction is not pathognomonic, still it is quite suggestive. In his series of cases, Kayser, using the glycyl-tryptophan test, found that all cancerous cases reacted positively. He concluded that a positive reaction is strong evidence of the presence of cancer, while a negative reaction does not exclude carcinoma.

Oppenheimer's results, on the whole, with the glycyl-tryptophan reaction have been quite satisfactory. He, however, suggests a substitute for this test: Forty minutes after an Ewald breakfast, the stomach is emptied and the contents filtered. To the clear filtrate add cautiously drop by drop, a 3 per cent. acetic acid solution. In case the reaction is positive a turbidity appears which vanishes after considerable acetic acid, or a little hydrochloric acid, is added. Dilution with one to five volumes of distilled water causes the cloud to remain. The only source of error is mucus which also gives a cloud with acetic acid; but this cloud is unaffected by the addition of a few drops of hydrochloric acid, and does not occur in high dilution in gastric contents. If the gastric filtrate is so turbid that dilution with an equal quantity of distilled water does not clear it, the acetic acid test cannot be employed. Slow filtration through a folded wet filter paper usually yields a clear filtrate. Oppenheimer has not determined the cause of this reaction. The test may be applied to vomitus, and blood and pancreatic juice are no disturbing factors.

Fränkel is of the opinion that further study of tryptophan in general will throw much light on our knowledge of cancer.

Jacque and Woodyatt found that saliva that is free from bacteria does not split Witte peptone or glycyl-tryptophan. According to

them, normal gastric juice free from blood, bile, trypsin and bacteria has no peptolytic power. This observation would seem to confirm the findings of Neubauer and Fischer. In about 88 per cent. of their cases of cancer of the stomach, they found a peptolytic power two to ten times the maximum peptolytic power seen in benign conditions in general. In their tests they used Witte peptone instead of the "ferment diagnosticum" of Neubauer and Fischer. It is always essential to eliminate bacterial action in this test, and Jacque and Woodyatt recommend that the gastric contents to be tested be passed through a Berkefeld filter.

Kuttner and Pulvermacher used silk peptone (seidepeptone) instead of glycyl-tryptophan. The advantage of this method is that it is less expensive, but there is that disadvantage that the test is too cumbersome. The peptolytic action is estimated by observing the tyrosin precipitation with the microscope.

Barlocco reported that when gastric contents are removed from the stomach after a test breakfast (and are neutralized and neutral casein added), upon being placed in an oven, a moderate increase in amino acids is observed in benign cases—0.4 to 0.515 parts per thousand. In cancer cases, these amino acids are much increased—0.8 to 1.3 parts per thousand.

Friedmann and Hamburger have suggested another test for gastric cancer. It consists in estimating the proteolytic and peptolytic power of the gastric juice. The proteolysis is determined by means of edestin, while the peptolysis is determined by means of the Jacque and Woodyatt method. The conclusions that Friedmann and Hamburger reach are that high peptolysis and low proteolysis is indicative of cancer while a high peptolytic index and a high proteolytic index is against cancer.

Quite a number of observers have found the glycyl-tryptophan test valueless. I will quote Sanford and Rosenbloom: "One of the most striking things about the glycyl-tryptophan test has been the wide differences of opinion regarding its value. Some pronounce it very good; others maintain that it is valueless and that glycyl-tryptophan in stomach contents yields tryptophan in a large number of cases in which no cancer exists. The wide divergence of opinion may now be explained on the basis of Warfield's findings, who has shown that the saliva of several persons, when not materially acid (to litmus) to begin with, has the power of decomposing glycyl-tryptophan into its constituent amino acids. Warfield's results make it evident that swallowed neutral or alkaline saliva, when mixed with neutral or faintly solid gastric contents, imparts to the latter the power of producing tryptophan from glycyl-tryptophan, thus rendering the tryptophan test of doubtful value in any instance, if not wholly violating it. Weinstein has verified Warfield's findings, and concludes that although Warfield's

results discredit the glycyI-tryptophan test, they do not depreciate the value of the tryptophan test, because the salivary peptidase does not produce tryptophan from the proteins in non-cancerous gastric contents. Weinstein has reported a few results which led him to conclude that the peptidolytic enzyme in saliva is unable to produce tryptophan from White peptone, even after seven days' incubation in the presence of toluol. We (Sanford and Rosenbloom), on the contrary, have found that the salivary peptidase may produce tryptophan from Witte peptone and also from casein. We have also observed that this enzyme was absent from some specimens of saliva which were not acid (to litmus) to begin with."

From these results Sanford and Rosenbloom conclude that both the glycyI-tryptophan and the tryptophan reaction is of no value, and if their observations are without error, it is difficult to see what reliability can be placed in these polypeptide tests for carcinoma. Ehrenberg, Grani, and Ley, working independently, came to similar conclusions. Hamburger states that the cancer ferments which split glycyI-tryptophan are ereptases, which cannot be distinguished from the ereptases present in normal cells, milk, saliva, etc.

In 1912, Medina suggested using glycyI-tyrosin which contains 45 per cent. tyrosin, for cancer diagnosis. In carcinomatous conditions this substance is broken up, and the tyrosin which is liberated can easily be recognized upon centrifugalization, by its typical crystalline form.

Schryver and Singer found that the ferment that is capable of hydrolysing Witte peptone is not peculiar to cancerous states of the gastric mucosa, but is common whenever there is a low acidity accompanied by a dilatation of the stomach with gastric stasis.

Smithies modified the polypeptide splitting reaction as a test for gastric cancer. He states that while the reaction is not specific for carcinoma, still it is of great aid with the other symptoms. He believes that the study of this test will prove very valuable at some future time.

Certain authors have laid great stress upon the quantitative determination of pepsin in the gastric contents as an indicator of malignancy. Ellenberger and Scholz stated that when it is found that the gastric contents contain little or no pepsin while simultaneously there is present in the urine a marked quantity of pepsin, one should always suspect carcinoma. Willenko found that there is a decrease in pepsin in cases of cancer both in the gastric contents and in the urine. On the other hand, Tachau could not be convinced that the presence or absence of cancer was in any way significant of malignancy.

A number of hemolytic and anaphylactic reactions have been

found for the gastric contents of patients suffering with carcinoma ventriculi. Livierato reports that he has obtained specific anaphylactic reactions by injecting carcinomatous gastric contents into animals. He first neutralized the gastric contents and he filtered it through a Chamberlain filter. He injected it subdurally into animals which had been previously treated with extract of mammary cancer. Only the cancerous gastric juice induced anaphylaxis.

Grafe and Röhmer, observing the severe secondary anemia which frequently attends gastric carcinoma, and being aware of the hemolytic substances usually present in malignant tumors, concluded that similar substances should be demonstrable in the stomach contents of individuals suffering from gastric carcinoma. The method employed by them will be briefly described: The stomach is well washed out and the patient is given an Ewald test meal. After 45 minutes this is removed; 100 c.c. of normal saline or distilled water being used to accomplish its thorough removal. Sodium bicarbonate is added to this fluid until it is slightly alkaline; 100 c.c. ether are then added and the mixture is shaken in an apparatus for 12 hours. The ether is then separated, evaporated, and the residue is then taken up in normal salt solution, 1 c.c. of the latter being used for each 10 c.c. of the gastric contents originally removed. Quantities of this resulting solution, ranging from 0.1 to 1.0 c.c., are then placed in appropriate tubes and to each is added 1 c.c. of a 5 per cent. solution of washed rabbit erythrocytes. Finally normal saline solution is added to each tube until the total quantity in each tube measures 3 c.c. The tubes are then placed in a thermostat at 37 deg. C. for three hours, during which time they should be well shaken at least three or four times. They are then placed on ice over night and are then inspected for hemolysis. Complete hemolysis is a positive response to this test. The authors of this test found that cancerous gastric juice invariably responded to this hemolysis whereas the juice of normal subjects yielded negative results. Sisto and Jona also look upon this reaction as very reliable.

According to Gräfe and Röhmer the hemolytic substance in cancerous gastritis is soluble in alcohol and ether, is thermostable, and is capable in the smallest quantities of inducing hemolysis in human and animal blood. It is, in all probability, a lipoid, the active principle of which is probably oleic acid derived from the carcinomatous, ulcerated stomach wall.

Fabian and Livierato, on the contrary, did not get such good results. Fabian used the test in 28 cases. Of these 12 were cases of gastric cancer, 7 of which reacted positively and 5 negatively even though 3 of the latter cases had extensive metastases in the great omentum. Of 7 cases of gastric ulcer, 2 gave a posi-

tive reaction. Livierato performed the test on 23 cases of carcinoma of the stomach, and 34 cases of other diseases of the stomach. In the cancerous conditions he obtained positive results in 65 per cent. of the cases, while in the other disorders he obtained positive results in 56 per cent. This test is, therefore, according to him, of little value.

Gräfe found that the hemolytic effect of the ethereal extract of cancer gastric juice is due to the presence of oleic acid. As has been said before, we could not corroborate this finding. Kuntz, also, found that the Gräfe-Röhmer hemolytic reaction was only obtained with cancerous gastric juice. In contrast to the latter, Frye and Leffman found that the washings of the gastric mucosa of 14 out of 17 cases, positively non-cancerous, were hemolytic, especially when bile or trypsin was present.

The microscopic findings of the gastric contents may aid in the diagnosis of cancer. Bits of mucous membrane and of cancer tissue are not commonly found. When they are found the cancerous growth is usually far-advanced. Sahli, however, believed that a thorough lavage at night and a second lavage in the morning on an empty stomach would reveal in the last washing portions of the tumor. "A true bit of tumor," writes Stockton, "is the only pathognomonic sign of cancer of the stomach." Lubarsch regards early diagnosis by this means as impossible. Malkow found bits of tumor in the feces. Kuttner has never been able to derive much help in diagnosis from examination of fragments of the gastric mucosa recovered from the stomach washing, because they can be obtained but rarely. When such fragments can be examined the information is important. Cohnheim considers the presence of infusoria and protozoa upon the gastric mucosa as an early sign of cancer, since after putrefaction sets in these organisms quickly disappear. The infusoria that Cohnheim found in 6 cases of cancer are the *trichonomas* and the *megastoma entericum*. Heuser, Strube, and Zabel confirmed these findings. *Amebae* and *flagellata* are found in cases of cancer of the stomach in which no stasis exists.

The Oppler-Boas bacillus was at one time supposed to be diagnostic of carcinoma ventriculi. Sick states that this bacillus is seldom absent in cancer, but may exist even in the presence of little hydrochloric acid. The presence of the bacilli is of no value in the diagnosis of cancer, because they exist in gastric stasis with low or absent hydrochloric acid. They are also present in motor insufficiency. However, according to Sick, the presence of the bacilli together with large amounts of lactic acid, is a strong indication of cancer.

In 1903, Schmidt called attention to the presence of lactic acid bacilli in the stools of patients suffering from carcinoma of the

stomach, and emphasized the importance of this observation from the standpoint of diagnosis in those cases in which a test meal is contraindicated. Sandberg undertook an investigation of the same nature. In doing so he originated a method for culturing the organisms, which, on account of its apparent reliability and simplicity, seems to possess considerable value. His method consists in sterilizing with chloroform the gastric contents of patients suffering from gastric carcinoma. One must first be sure that the gastric contents contain lactic acid; 45 c.c. of this fluid are then inoculated with two platinum loops of the feces to be examined for the presence of lactic acid bacilli. These are well mixed and allowed to stand at room temperature. After 24 hours a grape sugar agar plate is inoculated from this mixture of feces and gastric juice. In this way a colony of lactic acid bacilli is isolated. Sandberg believes that lactic acid is only present in the feces when it is present in the gastric juice.

Latzel believes that the finding of Oppler-Boas bacilli and lactic acid bacilli are only then significant of carcinoma when the other symptoms point to a malignant new-growth of the stomach.

Baradoulin, a Russian, thinks that by determining the "digestive leukocytosis," we will find an early sign of the onset of cancer. In 10 cases of carcinoma of the alimentary tract, which he examined, he found "digestive leukocytosis" absent in all but two cases, in which hydrochloric acid was still present. He also reported absence of digestive leukocytosis in malignant neoplasm of the breast, maxilla, and rectum. In gastric ulcer the "digestive leukocytosis" was always present. He explains the absence of this "digestive leukocytosis" to be due to a paralysis of the lymphatic glands by the cancer toxin so that they fail to respond to such a mixed excitation as the process of digestion.

The finding of blood in the gastric contents after a test breakfast (together with a suspicious history and other symptoms) is very highly significant of malignancy. According to Zoeppritz, occult blood is the most important of the non-specific symptoms of gastric carcinoma and appears early, while negative findings speak always against cancer.

There are several urinary tests that have been suggested as aids to the early diagnosis of carcinoma. In the last few years a large literature has appeared on this subject. Though no definite conclusions can yet be drawn, still many authors have expressed great enthusiasm for these methods and I shall dwell upon them specifically. These reactions can be thus subdivided:

1. Determination of colloidal nitrogen.
2. Estimation of the neutral sulphur.
3. Determination of oxyproteic acids.

4. Experiments with enzymes.
5. Sundry other methods.

The Colloidal nitrogen in the urine is the most important of these. In 1892, Töpfer found that the urine of patients suffering from cancer contained a very large amount of "extractive substance." This extractive substance was calculated by first determining the total nitrogen, and then subtracting from this amount the sum of the nitrogen values for the urea, uric acid, and ammonia contained in the same urine. Bondzynski and Gottlieb, five years later, reported that the nitrogen in oxyproteic acid is 2 to 3 per cent. of the total urinary nitrogen. Salkowski, and Hess and Saxl, using different procedures in their researches came to the conclusion that the oxyproteic acid (or the alcohol precipitable substances) are increased in the urine of human beings suffering from carcinoma. Salkowski and Kojo, in a preliminary communication, recently suggested several methods for the determination of colloidal nitrogen in the urine. A year later Kojo published the results of a comparative study of the various procedures suggested in this connection. We (Kahn and Rosenbloom) studied the zinc sulphate-precipitable colloidal, nitrogenous material from the urine of normal subjects as well as from the urine of carcinomatous patients, and came to the conclusion that the amount of colloidal nitrogen was invariably increased in carcinomatous growths. But we also found that diseases like myocarditis, diabetes, leukemia and anemia also give a high colloidal nitrogen index, so that we concluded that this determination was not specific. The method that we used was the following: The urine is first tested for protein, which if found, is removed by means of heat coagulation after the addition of a few drops of dilute acetic acid solution. To 100 c.c. of the well mixed, filtered, 24 hours' specimen of urine, zinc sulphate is added in sufficient quantity to effect saturation. The saturated liquid is allowed to stand for 24 hours. It is then filtered through an ashless filter paper, and the precipitate is washed five times on the paper with saturated zinc sulphate solution. The paper and precipitate are then placed in a Kjeldahl flask and the nitrogen content determined by the Kjeldahl method. The nitrogen in 5 c.c. of urine is also determined by the Kjeldahl method, and the ratio of the nitrogen in the zinc sulphate precipitate to the total urinary nitrogen is computed.

The normal amount present represents, as a maximum 2.2 per cent. of the total nitrogen, whereas in cancerous conditions it is more than 4.0 per cent. of the total nitrogen.

We (Kahn and Rosenbloom) also had occasion to study the amount of colloidal nitrogen in the urine of a dog suffering with a malignant neoplasm, by means of actual dialysis, and we found that

the nitrogen was much increased in the diseased dog, as compared with the amount present in normal dogs. The method we used consisted of precipitation with alcohol, and dialysis through a parchment paper bag.

Volpe found that the colloidal nitrogen index is of extreme value as an aid to cancer diagnosis. Mancini, using the Salkowski method, found that there is an increased elimination of colloidal nitrogen in the urine of patients afflicted with cancer. He states, however, that this increase is not specific for carcinoma, since he obtained similar results in pneumonia and pleurisy as well. Semenov found that the colloidal nitrogen output is low in normal individuals and is increased in the urine of cancer patients. He concludes that, although the normal index excludes the possibility of a malignant neoplasm, the increased amount of colloidal nitrogen in the urine is not specific for carcinoma. Konikov, another Russian, found that the average amount of colloidal nitrogen in the urine as determined by the Salkowski-Kojo method was 1.68 per cent. of the total nitrogen in normal cases, and 2.47 per cent. in carcinomatous individuals. Of 23 cases of cancer investigated by him only 9 showed a higher coefficient than 2.5 per cent.

According to Marcel, Labbé and Dauphin, the increase in urinary colloidal nitrogen is an index of a derangement of nitrogen metabolism, and while it may serve to detect functional insufficiency of the liver, it is not at all specific for cancerous states. Carforio, also, concluded from his research that the colloidal nitrogen index is not pathognomonic of cancer.

Salomon and Saxl reported that the increased excretion of oxyproteic acid is indicative of carcinoma. The method that they used is very complicated and tedious, as much so, that several attempts to duplicate their work, that we made (Kahn and Rosenbloom), were entirely unsuccessful. We doubt very much the feasibility of their method or the clinical significance to be placed in the oxyproteic index.

In the urines from 92 non-carcinomatous cases, Salomon and Saxl found oxyproteic acid in 88 to the extent of 1.5 per cent. total nitrogen; only in three cases of liver affection was over 2.1 per cent. total nitrogen found as oxyproteic acid. Of 64 tests on 38 carcinoma cases, 31 gave oxyproteic acid from 2.5 to 3.5 per cent.; in 3 non-carcinoma cases under 2 per cent. were obtained. The size or position of carcinoma or the degree of cachexia was not of influence on the oxyproteic acid excretion.

Further experience has confirmed the previous announcement of Salomon and Saxl of the presence of polypeptides, of oxyproteic acid in particular, in the urine with cancer. They have now a record of over 500 urines which have been examined for their oxyproteic-acid content. In 70 per cent. of the cancer cases the findings were constantly positive, while they were positive only in a

very few other cases, and those mostly very serious conditions. The reaction, however, was obtained in pregnant women the same as in cancer. Even with early small cancers the reaction proved positive in many cases. The disappearance of the reaction after the cancer has been removed testifies to its connection with the malignant disease, but it seems to be independent of the cachexia and of the size and location of the tumor. The reaction is obtained by oxidizing out the neutral sulphur element of the oxyproteic acid in the urine. This is done with hydrogen dioxid, as they describe in detail; a distinct precipitate is thrown down in the urine from cancer patients while there is scarcely a trace of precipitation in other urine.

According to Saxl, the disturbances of the protein metabolism of cancer patients are similar to those caused by feeding small amounts of thiocyanate to healthy men. In both conditions an increased excretion of ammonia, neutral sulphur, and oxyproteic acid in the urine occurs. The urine of cancer patients contained 12-26 mg. of thiocyanate per 100 c.c., while in non-cancerous individuals the figure was 4-13 mg. The increase in thiocyanate excretion is independent of food, anemia, and cachexia. Fever increases the thiocyanate, but not to the same degree as cancer.

In addition to the various tests that they have previously suggested, Salomon and Saxl have described a neutral sulphur reaction in the urine of cancer patients. Like all the other reactions, there are those investigators in whose hands it has given excellent results, while, on the contrary, in the hands of other observers it has proved valueless. The abnormal constituent in the urine of carcinomatous patients is a neutral sulphur fraction whose sulphur can be split off by means of hydrogen peroxide, and can be determined as barium sulphate; positive urines yield 0.010-0.018 gms. barium sulphate from this form for 100 c.c. of 41 carcinoma cases, 30 were positive, 4 faintly positive, 1 questionable, and 6 negative. Of 182 normal urines, 6 were positive, 3 faintly positive, 1 questionable and 172 negative.

The technic of the Salomon-Saxl neutral sulphur reaction is the following: 150 c.c. urine, freed of albumin by heat and acid, are diluted with 100 c.c. water. A mixture of 100 c.c. of a saturated aqueous barium hydroxide solution and 50 c.c. of a saturated aqueous solution of barium chloride are added, filtered and the filtrate tested with barium to see if the precipitation is complete. In order to remove the ethereal sulphates, 300 c.c. of the filtrate are made acid with 30 c.c. hydrochloric acid, boiled for 15 minutes in a 500 c.c. Erlenmeyer flask, using a funnel condenser. The flask is placed on a water bath for 24 hours; the mixture is filtered and 200 c.c. of the clear filtrate are mixed with 3 c.c. of hydrogen peroxide or with 30 c.c. Oxydol-Petri, and boiled for 15 minutes with a funnel condenser. After boiling the liquid is allowed to

stand in a conical glass, where, at the end of 6 hours, the amount of brown precipitate is estimated.

Antipyrin and creosote medication interfere with the test.

Petersen followed the original technic of Salomon and Saxl in his studies of the cancer cases. He divides his cases into three classes: (1) clinically non-cancerous suspects—of 27 patients examined 25 gave a negative reaction; (2) clinical cancer suspects—of 20 cases examined, 5 were negative, 2 alternate positive and negative reactions, and 13 cases positive; (3) manifest cancer—of 19 cases 17 always gave a good positive reaction, the 2 negatives being icteric and cachectic. Dozzi found the test was invariably negative in all his patients free from cancer or tuberculosis, but the frequency of the positive reaction in tuberculous patients detracts from its value as a sign for cancer, although it is rarely that cancer is mistaken for tuberculosis. The only cancer cases that gave a negative result were those in whom the cancer had been excised. Murachi also found an increase in the neutral sulphur in cancer patients. The coefficient, according to him, may reach 3.8 per cent. of the total sulphur.

In contrast to the above, Pribram found that only 60 per cent. of the cancer patients gave a positive Salomon-Saxl reaction, while 35 per cent. of non-cancerous conditions gave also a positive reaction. The test is, therefore, not pathognomonic. Alekseev came to a similar conclusion. Pribram recommended that instead of using perhydrol, potassium permanganate should be used as the oxidizing agent. This was also suggested by Petersen.

Kaldeck is convinced that this reaction has no special relation to cancer. In 9 carcinoma cases, he obtained a positive reaction in 4, a negative reaction in 4, and a doubtful reaction in 1; in 33 non-cancerous conditions, 8 reacted positively to this test. Mazzitelli has studied the test in 50 cases of cancer, with or without cachexia. In 18 cases of the latter variety, the reaction was positive in 14, and all but 2 of 10 patients of tuberculosis. The reaction was positive in 16 of 26 cases with cachexia of various origin; including 11 with cancer and 4 with tuberculosis.

Greenwald, who has studied this reaction very carefully, concludes that the Salomon-Saxl neutral sulphur index has no value in the diagnosis of cancer. He obtained similar results with cancerous and non-cancerous cases.

In an analysis of the urine of 60 cases of carcinoma, Kessler found that in general the specific gravity is reduced, the total sulphur output is less, while the chlorine excretion is normal. Stadtmüller and Rosenbloom, from their study of sulphur metabolism in various diseases, concluded that the lowest average total sulphur excretion (0.88 gram per day) was found in a series of 13 cases of carcinoma. The same series showed also the lowest average neutral sulphur excretion. The proportion of neutral sul-

phur to total sulphur in this group they found to be considerably higher than the normal proportion of total sulphur excreted as neutral sulphur. They conclude that it is a precarious "undertaking to diagnose a malignant tumor on the basis of the absolute or the relative amount of the neutral sulphur excreted in the urine, or from the daily excretion of total sulphur."

Fuhs and Lintz reported that with methylene blue one could test for the presence of cancer. This is an empiric finding, and should not be much credited. I have had occasion to perform this test and I am convinced that it is valueless. Three or 5 drops of Löffler's methylene blue are added to a test tube full of urine. The urine is shaken and then allowed to stand from 12 to 24 hours. A control test is made with normal urine. According to the authors, a decoloration of the lower layer of urine is indicative of cancer. Verbrycke reported that this test has no value.

As another test for malignant neoplasm (carcinoma or sarcoma), Davis recommends the following "hema-uro-chrome reaction." To 100 c.c. of urine add 10 c.c. of hydrochloric acid and heat to boiling. Cool, add 30 c.c. ether and agitate the mixture for some time. After 12 hours remove the ether to a clean white porcelain dish, and allow it to evaporate spontaneously. If the ether is pink and leaves a reddish residue, "hema-uro-chrome" is present.

The enzymes in the urine have also been examined to obtain assistance in cancer diagnosis. Scholz found increased pepsin index in the urine of cancer patients. Takeda, on the contrary, reported that in diffuse carcinomatosis, pepsin (tested by edestin) is absent in the urine. Bieling states that in advanced cases of carcinoma there is no urinary pepsin. He concludes that the quantitative determination of urinary pepsin is without purpose as an aid in the early diagnosis of cancer, because there is nothing characteristic in its presence or absence. Strauss has examined the conditions in regard to the pepsin in the urine in 23 patients with carcinoma and 22 with non-cancerous aepsia. The results of his research demonstrate that too many factors are involved in the output of pepsin in the urine for it to have much specific diagnostic importance.

At one time Rosenbach suggested that the high proportion of fatty acids in the urine indicated cancer, but this finding has not been confirmed. Siegel doubts the diagnostic value of the high index of volatile fatty acids, and Rosenfeld states that the variations are too great to be relied upon.

Morris considered that primary or metastatic growths affecting serous surfaces might secrete their ferment directly into the serous cavity and fluid occupying it. That in those fluids resulting from pressure on vessels there should then be an absence in this ferment. In certain cases of cancer, therefore, there might well be an in-

crease in the incoagulable nitrogen. With this idea in view, Morris has examined 25 fluids, removing the coagulable proteins according to the method of Hohlweg and Meyer, slightly modified. This consists, in brief, of precipitating the proteids by a reagent of acetic acid and monocalcium phosphate, and sodium chlorid, and testing the filtrate for nitrogen by the Kjeldahl method. From the literature and his own observations, Morris has selected 78 cases. The fluids are divided into three groups according to their content in incoagulable protein, the nitrogen being expressed in grams per cent. It thus appears that a puncture fluid with incoagulable nitrogen below 0.07 gm. per cent. is probably not of malignant origin; while a very high percentage of incoagulable nitrogen is, to say the least, a suspicious circumstance.

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Progress of Diagnosis and Prognosis

GENERAL METHODS OF EXAMINATION—SYSTEMIC AFFECTIONS—DISORDERS OF GENERAL METABOLISM

The Normal Differential Leukocyte Count—S. R. MILLER, Johns Hopkins Hospital Bull., Oct., 1914.

The total leukocyte count and differential formula in normal individuals are subject to relatively wide variations, which must be considered in the interpretation of studies made upon the bloods of individuals presumably suffering from abnormal conditions. The interpretation of any differential count should be based upon (a) a knowledge of that particular individual's normal blood picture, when possible; (b) the average values for the locality in which that individual resides; (c) a consideration of those factors peculiar to the individual which might modify that particular blood. Differential leukocyte counts should always be reported in terms both of percentage and absolute numbers per cubic millimeter, and in all cases, where possible, more than one differential count should be made, especially in borderline cases in which slight changes are to be regarded as of diagnostic or prognostic value. The tendency to ascribe a diagnostic value to lymphocytosis is probably overdone. Only when the mononuclear elements constantly exceed the average percentage, absolute values and upper limits of variation (35 to 49 per cent.) for the community and when all modifying factors are considered, should one attempt to draw valuable conclusions from the figures obtained.

WESTERN.

A Simple Test for the Detection of Bile Pigments and Hemoglobin in the Urine—H. LIPP, Münchener med. Wochenschr., Sept. 22, 1914.

Description of a very simple method for the detection of bile pigments and hemoglobin and their differentiation. A stratum of very white sand, 3 to 4 cm. in thickness, is spread upon a plate. Some of the suspected urine is placed thereon. If coloring matter is contained in the urine there will be a stain in the white sand. This stain is brown if hemoglobin has caused it; it will be somewhat greenish if it was produced by biliary pigment. This sand test is very reliable and can be executed without cumbersome preparations, and without chemicals, filter and spectroscope.

MILL.

Urine during the First Days of Life—T. FRANZ and A. v. REUSS, Zeitschr. f. Kinderheilkunde, Vol. XI, No. 3, 1914.

The great majority of newly born babies excrete small amounts of albumin and albumin-precipitating substances (acetic acid bodies)

during the first three days of life. This is probably the result of the circulatory changes starting intra partum. Hence the albumin is an entirely physiological phenomenon. Larger amounts of ingested sugar never appear in the urine of the newborn. Sensitive tests may demonstrate the occurrence of small quantities of nitrates or nitrites, and indican. These substances are undoubtedly the consequence of slight enteric disturbances of the first days of life and are of no clinical significance.

MILL.

Mild Erythrocyturia in Nurslings and Children—CASTRO, Zeitschr. f. Kinderheilkunde, Vol. XI, No. 4, 1914.

In otherwise normal nurslings it is not a rare occurrence that red blood cells are excreted in small amounts by the urine. This phenomenon may ensue for an entire week. It is due in most instances to some infection, but in a certain proportion of the cases there may be some inherited disposition at the bottom of it. The pathological basis of the phenomenon is apparently a very slight toxic injury of the kidneys, but it has also been observed before or after a pyelitic process. It stands in no relationship to Barlow's disease.

MILL.

The Ratio between the Excretion of Urinary Ammonia-Nitrogen and Total Nitrogen—Z. TANJI, Deutsches Archiv f. klin. Medizin, Vol. CXVI, Nos. 1 and 2.

The proportion of ammonia-nitrogen to that of the total nitrogen in the urine of man, dogs and rabbits has the tendency to decline when the proteids are preponderating in the food. The proportion is distinctly greater when rice is being ingested. The reason why there occurs a relative increase in ammonia excretion when a rice regimen is being pursued is that while on such a diet the blood alkalescence is more or less diminished.

WESTERN.

Indicanemia and Uremia (Acetonemia)—J. TSCHERTKOFF, Deutsche med. Wochenschr., Sept. 3, 1914.

Irrespective of the nature of the diet, urea retention or indican is never encountered in the serum of healthy or diseased individuals without renal insufficiency. In nephropaths who have considerable urea retention in their serum, indicanemia is a regular occurrence. In the presence of a urea content of about 1.5 per mille, indicanemia was never missing. In chronic nephritis indicanemia and urea retention of 1.5 per mille are unfavorable symptoms, indicating grave renal alterations. Indicanemia is the only sign of renal insufficiency in those cases in which acetonemia has attained a normal degree through alimentary influences.

MILL.

Antitrypsin and Leukocytosis in the Blood Serum after Laparotomy—
D. GORBAKOWSKY, Beiträge z. Geburtshilfe u. Gynäkologie, Vol. XIX,
No. 3, 1914.

After an operation in the abdomen there always ensues an increase in leukocytes. There exists a certain connection between the production of antitrypsin and the increased destruction of leukocytes. For purposes of differential diagnosis and prognosis the determination of the antitrypsin content and the number of leukocytes in the blood serum are of no value. MILL.

Influence of Nephritis upon Procreation—J. CECIKAS, Wiener klin. Wochenschr., July 23, 1914.

Of 28 women with nephritis 8 gave birth to healthy children; 5 were sterile. The patients aborted 36 times; 8 aborted each once; 4 each twice; 2 each 3 times; 2 each 4 times; and 1 six times. The ability to procreate is also diminished in male subjects affected with nephritis. MILL.

The Basedow Syndrome and Acute Infectious Thyroiditides and Strumitides—D. D. PLETNEW, Zeitschr. f. klin. Medizin, Vol. LXXX, Nos. 3 and 4.

In the course of various infectious diseases the thyroid gland, the normal as well as the diseased, may become involved in an acute inflammatory process. The inflammatory changes may be either called forth by exclusively local or by thyrotoxic manifestations. In such cases there exists no hyperthyroidism, but dysthyrosis. The toxic influences are not only noted in the thyroid alone, but also in other glands with an internal secretion. Thus we may designate such instances as multiglandular affections. WESTERN.

Tuberculous Etiology of Thyroses—MENZER, Zeitschr. f. Tuberkulose, Vol. XXII, No. 4.

Patients with thyrotoxic manifestations showed specific reactions after subcutaneous injections of Landmann's tuberkulol. There seems to be a connection between the thyroses and tuberculosis. FRY.

The Shoulder Pain—LÖFFELMANN, Beiträge z. klin. Chirurgie, Vol. VIIIC, No. 4, 1914.

The shoulder pain may be of great value in differential diagnosis. It is unquestionably a symptom of a number of internal diseases, but its significance must, of course, not be overrated. Author describes the symptom as a manifestation of perforated gastric ulcer and duodenal ulcer. Of the former he noted it in 4, of the latter in 12 cases. The symptom is met with in abscess of the liver provided the abscess is situated on the convex surface of the liver so that it involves the diaphragm. MILL.

Myositis Ossificans Traumatica—H. SCHÖPPLER, Münchener med. Wochenschr., Oct. 6, 1914.

Report of a case of myositis ossificans traumatica. Author is of the opinion that in all pertaining cases there must have been an injury to the soft parts in which the pathological process runs its course. The consequence must necessarily be the destruction of a portion of the soft tissues. On the basis of such lesions a stimulus arises that gives occasion to the development of young connective tissue rich in cellular material. Thus the calcification process of the tissues may be brought about. The calcium is obtained from the calcium content of the bones, and thus the problem of myositis ossificans is a problem of calcium metabolism in the last instance.

MILL.

Rheumatoid Arthritis—D. D. BROWN, Brit. Med. Jour., Oct. 17, 1914.

Rheumatoid arthritis is increasing in frequency and is more readily diagnosed than in former times. Author is emphatic in stating that the disease is curable. Among general causes of the disease, the absorption of toxic products heads the list. Pyorrhea alveolaris is the causative factor in 70 per cent. of the cases. Leucorrhea, local suppurations, worry, and thyroid changes are other causes. Artificial and natural menopause, and inflammatory abdominal conditions are to be included under the general etiological factors of the disease.

SACHS.

Fibrocystic Disease of the Bones—R. C. EMSLIE, Brit. Jour. Surg., July, 1914.

Simple single cysts with perhaps some tissue of a compound nature in the walls, but with no evidence that they have arisen from myelomata, occur in the upper end of the humerus, in the neck of the femur in young children, in the lower end of the femur, and occasionally in other bones. Cysts which definitely result from alteration in myelomata occur in the clavicle, radius, lower end of the femur, tibia, fibula. Cysts intermediate between these two varieties occur in the humerus, lower end of the femur, tibia, and fibula. Cysts embedded in masses of composite tissue, usually described as fibrous osteitis, occur chiefly in the femur, tibia, and skull. Fibrous osteitis with cysts occur in the tibia. There are multiple cysts occurring in bones. Multiple bone lesions occur, composed of some cysts, some solid tissue containing cysts, and some solid tissue without cysts. Myeloid sarcomata and cysts may produce a diffuse disease of the bones, causing softening and fracture.

SACHS.

INFECTIOUS DISEASES.

Laboratory Diagnosis in the Early Stages of Congenital Syphilis—C. G. GRULEE, Am. Jour. Med. Sci., Nov., 1914.

There is no test which is proved to be pathognomonic of congenital syphilis in the early stages between the birth and the development of active symptoms. The examination of the urine and the routine

examination of cerebrospinal fluid for globulin content and cells offers little evidence of value for the diagnosis of this stage of the disease. The evidence as to the Wassermann reaction all goes to show the unreliability of the test at this age. The Lange gold chlorid reaction on the cerebrospinal fluid offers at present some hope that the evidence obtained in this way may be of distinct benefit. So far as we may judge from the luetin test, as at present reported, active treatment with mercury materially influences it, so much so that without the mercurial treatments no cases have as yet proved positive. It may be said, however, that the Noguchi test has a distinctly negative value, inasmuch as in all cases not syphilitic the reaction was negative.

SACHS.

Comparative Wassermann, Cobra, and Globulin Tests in Syphilis—W. J. STONE, *Med. Rec.*, Sept. 26, 1914.

The conclusions given comprise comparative cobra, Wassermann, and globulin tests in 105 individuals. All "suspicious" reactions have been excluded. (1) In 30 normals and controls the Wassermann and cobra tests were negative. In 6 of these the globulin test was negative in spinal fluid. In 90 other normals and controls the cobra test was negative. (2) In 22 patients with secondary syphilis the Wassermann and cobra tests were positive. In 5 of these the globulin test was also positive in the spinal fluid, while in 7 the globulin test was positive in the blood serum. (3) In 7 patients with active and latent tertiary syphilis the cobra blood test was positive, and the globulin tests in blood serum and spinal fluid were positive. (4) In 24 late tertiary and clinically cured cases both Wassermann and cobra tests were negative. (5) In 1 patient with cerebral lues the Wassermann and cobra tests were negative, while the globulin test was positive in blood serum and spinal fluid. (6) In 7 patients with syphilis the cobra test was positive and the Wassermann was negative, while in 14 instances the Wassermann was positive and the cobra negative. Two of the latter were instances of early secondaries 5 and 6 weeks after infection, in which the diagnosis was not in doubt.

SACHS.

Noguchi Cutaneous Reaction—J. W. SQUIRES, *Urolog. and Cutan. Rev.*, Oct., 1914.

Only a few cases of primary syphilis were tested. None reacted to the cutaneous test. However, the complement fixation test was positive in each case. The majority of the reactions were negative in cases of secondary syphilis. Practically all the cases that gave positive reactions were undergoing active treatment. In this stage it is observed that the complement fixation test gives a much higher percentage of positive reactions. All but 4 of the 26 cases of tertiary syphilis which were tested reacted positively. Three cases of hereditary syphilis were tested and all gave a positive result. Experience

seems to show that this test when used in conjunction with the Wassermann reaction will prove a valuable aid in the diagnosis and treatment of syphilis.

SACHS.

Tertiary Syphilis with Splenic Hypertrophy—JEANSELME and SCHULMANN, Bull. et Mém. de la Société méd. des Hôpitaux de Paris, Vol. XXX, No. 19, 1914.

Report of a case of tertiary syphilis with uncomplicated hypertrophy of the spleen, but without much enlargement of the liver. Administration of neosalvarsan acted favorably. Authors recommend such treatment in all instances of splenomegaly with positive Wassermann reaction.

ZIMMER.

Syphilis of the Vertebral Column—J. R. HUNT, Am. Jour. Med. Sci., Aug., 1914.

Syphilitic spondilitis and perispondilitis while rare are nevertheless sufficiently frequent to be given careful consideration in every case of acute or chronic vertebral disease. The onset may be sudden, simulating an acute rheumatic affection, or it may develop gradually and run an exceedingly chronic and protracted course. Localization in the cervical region should awaken a suspicion of lues, as more than half of the recorded cases are in this region. It may, however, occur in any portion of the spine. Of 100 cases available for analysis, author found that 25 per cent. were associated with some complication referable to the nervous system, either of the nerve roots, or of the spinal cord.

SACHS.

Early Diagnosis of Pulmonary Tuberculosis—E. STERN, Berliner klin. Wochenschr., July 27, 1914.

Anemia, dyspeptic disturbances, diarrheal stools, tachycardia and a slight cardiac enlargement toward the right point to the existence of tuberculosis. This provisional diagnosis is confirmed if there are present pains in the shoulder region or in the abdomen (pleurisy), mild chronic laryngitis with vocal cord paresis on the same side, undeveloped musculature and pupillary dilatation with sluggish reaction on the diseased side.

MILL.

Blood Examinations in Pulmonary Tuberculosis—SCHWERMANN, Zeitschr. f. Tuberkulose, Vol. XXII, No. 5.

Uncomplicated pulmonary tuberculosis exerts no influence upon the red blood cells and the hemoglobin. In grave and especially in far-advanced cases, on the other hand, a marked decrease of the hemoglobin content and the erythrocytes is often noted. This decrease is also observed in intestinal tuberculosis and after severe pulmonary hemorrhage.

FRY.

Albumin in the Sputum of the Tuberculous—G. HAFEMANN, Deutsche med. Wochenschr., Sept. 3, 1914.

Albumin demonstrated in the sputum on one occasion does not

permit of positive conclusions. Albumin when absent from the sputum when but one examination is made excludes tuberculosis. The sputum albumin is serum albumin, and is derived from the minute bronchial and alveolar vessels. MILL.

Albumin in the Sputum in Tuberculosis—C. H. COCKE, *Am. Jour. Med. Sci.*, Nov., 1914.

All cases of pulmonary tuberculosis showing bacilli give a positive albumin reaction in the sputum. Frequently albumin will be found in the sputum in incipient tuberculosis before bacilli are present, but its presence is variable and it cannot be relied upon as a definite means of diagnosis in incipient cases. The amount of albumin present in the sputum in tuberculosis depends upon the extent of the exudative or destructive process in the lungs, is always associated with an alveolitis, and may be an index of the activity of the process, the heavier the albumin content the more activity present. Certain forms of definite tuberculosis fail to show an albumin reaction in the sputum. Cases cured for 2 years or more will not show it. When physical signs and the tuberculin reaction fail to show activity the presence of albumin in the sputum may do so. As a diagnostic means its value is limited and relative and the result of a single examination misleading. It perhaps has greater value prognostically. SACHS.

Infection with Tuberculosis in Infancy—C. VON PIRQUET, *Edinburgh Med. Jour.*, Sept., 1914.

Author says that the prophylaxis of infant tuberculosis has chiefly to deal with the separation of the nursling from its adults who may have pulmonary tuberculosis. Bronchogenous infection with tuberculosis is the method of entry in 95 per cent. of children under one year. Enterogenous infection is not important, and a placentogenous infection of the fetus is a rarity, as is also stomatogenous and dermatogenous infection. SACHS.

Chronic Pulmonary Tuberculosis in Childhood—D. B. LEES, C. RIVIERE and W. I. BRUCE, *Brit. Med. Jour.*, Sept. 12, 1914.

An early sign of tuberculosis of the tracheobronchial glands is the fact that interscapular impairment occurs on the right side only. The cause of these right-sided signs is probably pressure on the right pulmonary artery which passes in front of the bifurcation glands. These glands are those which are most commonly tuberculous of all the thoracic group, and are probably the first to suffer. An increase in size and dulness of the interscapular area on the right side constitutes the sign. The normal impairment becomes more marked, being often sufficient to be termed dulness, and extends out 2 or 3 inches from the middle line. Percussed from without inward, a curved outer limit is noted, and the dulness may extend downward to the eighth dorsal spine. The clear outer limit can be shown to undergo a distinct respiratory fluctuation during deep breathing. SACHS.

Tuberculosis of Lymph-Nodes in Children—A. P. MITCHELL, Edinburgh Med. Jour., Sept., 1914.

Author examined 29 children under 12 years of age, particular attention being directed to the cervical, bronchial, and mesenteric lymph-nodes. Cultures from 12 cases were isolated, and 8 of these yielded the human type of tubercle bacilli, and 4 were of the bovine type. In the latter the mesenteric group of glands was more extensively caseated than any of the other groups. SACHS.

Tuberculosis of the Bronchial Gland and Lung Hilus—H. F. STALL and A. C. HEUBLEIN, Am. Jour. Med. Sci., Sept., 1914.

Prior to the fifteenth year, tuberculosis of the bronchial glands and lung hilus is the most common form of the disease. The early symptoms are usually indefinite, and chiefly of toxic origin. While a cough is generally present, it may be entirely absent, even with advanced disease of the bronchial glands. Although the orthodox signs of incipient (apical) tuberculosis are not present in these cases—in fact the primary lesion is often present in the lower lobe—there are certain physical signs which are indicative of a pathological process at the lung-root. The significant signs are the “hilus dimple” (noted anteriorly over the hilus region at the end of inspiration), dilated veins, parasternal and paravertebral dullness, and most significant of all, a well-marked whispered bronchophony in the interscapular region (d’Espine’s sign). Radiography, and especially stereo-radiography, is of the utmost value in these cases, as it shows the exact location and the extent of the morbid process, and is the greatest stimulus to careful work. SACHS.

Wassermann Reaction in Malaria—W. FLETCHER, Lancet, June 13, 1914.

It has been stated by many observers that the presence of malarial parasites in the blood gives rise to a positive Wassermann reaction. Author says that this is not so if the method of Browning, Cruckshank, and McKenzie be employed. The distinguishing feature of the above method is the use of two antigenic extracts: one of ox-liver lecithin, and another consisting of a mixture of lecithin and cholesterin. SACHS.

Acid-Fast Streptothrix—D. J. DAVIS, Arch. Int. Med., July, 1914.

Weakly acid-fast branching mycelia growths (nocardia) which do not form ray-like granules, are a cause of a well-defined group of infections, the great majority of which are pulmonary. Author describes a case in which the pulmonary lesions were in all probability caused by such an organism. Such cases are not, as a rule, clinically distinguished from pulmonary tuberculosis. Potassium iodide, in large doses, should be given to these patients. SACHS.

Human Streptotrichosis—E. J. CLAYPOLE, Arch. Int. Med., July, 1914.

Streptotrichosis is frequently confused with tuberculosis, and is more common than is generally supposed. These two diseases may

exist in the same person at the same time. Sputum, pus, etc., should be stained with carbolfuchsin and Gram stains. Definite skin reactions may be obtained on persons with frank infections by means of streptotrichins, which are produced from concentrated glycerinated bouillon cultures. This skin reaction will demonstrate bone and gland infection as well as lung infections.

SACHS.

The Sporotrichoses—H. GOUGEROT, Med. Press (London), Oct., 1914.

Sporotrichosis may present every possible clinical aspect, for it may attack practically all the tissues. The more frequent clinical types are, (1) subcutaneous gummata disseminated all over the body; (2) infiltrating gumma of the skin simulating cancer, warty patches simulating lupus, epidermitis simulating ringworm, blephoritis, osteitis, laryngitis, etc.; (3) a chancre at the site of inoculation, ulcerous, vegetative, or warty, or it may be in the form of gummataus lymphangitis, involving or not the glands; (4) deep isolated lesions, osteitis, arthritis, synovitis, pyelonephritis, etc.; (5) isolated lesions of the mucosæ, ulceration of the pharynx simulating tuberculosis, lingual tumefaction simulating cancer, laryngitis, conjunctivitis, ophthalmia, keratitis, etc.

SACHS.

Organism of Small-Pox, Chicken-Pox, and Vaccinia—H. GREELY, Med. Rec., Aug. 1, 1914.

A large number of motile bodies were noted by author in fluid vaccine virus, and in the vesicles obtained from the same. The organism stained with Giemsa, Neisser, and Unna stains, and is evidently a sporothrix. A frequent form is a pneumococcus-like couplet which, when stained by Neisser's method, shows a colorless refractile capsule with slightly pink lining, of figure eight shape, and, within, a blue-stained nucleus in each section. The spores multiply in all skin lesions, developing into branching masses. At the end of these conglomerations, spores may often be noted, and when detached, are actively motile. Author thinks that these spores are identical with the "Cytoryctes variolæ" described by Councilman and others. They divide, and give rise in skin lesion, and in culture, to the formations, aforementioned. An apparently identical organism has been obtained from the vesicles of 25 cases of successful vaccinations, from a like number of undoubted cases of chicken-pox, and from 5 cases of small-pox.

SACHS.

Influence of Measles upon other Pathological Processes—H. KOCH, Zeitschr. f. Kinderheilkunde, Vol. XI, No. 4, 1914.

The rubeola infection often exerts a certain influence upon other disease processes. While the prodromic stage of measles, which is characterized by leukopenia, has an inhibitory influence upon inflammatory-exudative processes (suppuration, etc.), there is noted in the exanthematous stage of measles an influence upon allergic processes (tuberculin reaction). The post-exanthematous period of

measles is characterized by a decline of resistance of the organism which fact favors the production and extension of other pathological processes. MILL.

Epidemic of Measles during the Winter 1914—CARRIEU, Montpellier méd., Vol. XXXVII, No. 25, 1914.

Report of an epidemic of measles which had affected 400 persons causing 21 deaths. The infection was very frequent in adults, especially soldiers living in barracks. Besides the usual complications there occurred a number of rarer sequels, as pleurisy, nephritis, pericarditis, myocarditis and endocarditis. Benignity of the measles did not exist in adults. The severity of the clinical picture and the mortality increased in direct ratio to the number of the infected cases. The infection occurred most frequently before eruption of the exanthema, but it also ensued after the eruption. Of 382 soldiers 88 stated that they had had measles in childhood. Immunity for measles is hence neither absolute nor of long duration. Even during this epidemic 4 relapsing cases were observed. ZIMMER.

Doehle's Leukocyte-Enclosures in the Diagnosis of Scarlet—R. ISEN-SCHMID and W. SCHEMENSKY, Münchener med. Wochenschr., Sept. 29, 1914.

Authors reach the following conclusions: Absence of Doehle's leukocyte-enclosures (spirochetes and their disintegration products) in a febrile patient excludes acute scarlet. The presence of Doehle's bodies excludes roeteln (rubeola) and points to the probable absence of measles. The finding of the bodies points to the improbability of diphtheria and lacunar angina when typically-formed enclosures are present in very large numbers. MILL.

Some Manifestations of Influenza in Young Children—L. E. HOLT, N. Y. State Jour. Med., Oct., 1914.

The diagnosis of influenza is established only by finding the organism in the secretions; usually it must be the bronchial secretion. This renders its discovery difficult in young children. The bronchial secretion is not easy to secure. A diagnosis by the examination of smears is unreliable. Only cultures can be depended upon. It should be remembered that the *B. influenzae* grows only upon media containing hemoglobin (blood agar being that generally employed), so that cultures made upon ordinary diphtheria tubes are of no value. The difficulties of isolating the organism, even in cultures, are considerable, and outside of a good hospital laboratory the work can hardly be done satisfactorily on any extensive scale. Hence it is not surprising that so few observations upon the definite diagnosis of influenza have been made. What does the presence of the *B. influenzae* in the sputum signify? Some have said that it signified nothing; that the organism can hardly be regarded as pathogenic. Although this view was formerly held by many pathologists there are now few who maintain it. The occurrence of an acute

purulent meningitis in which this is the only organism found and the production of a similar inflammation by its injection in animals with recovery of the organism, certainly establishes the fact of pathogenicity. The *B. influenzae* is only one of the common organisms associated with respiratory infections. It is seldom seen alone and it is therefore difficult to determine exactly which of the symptoms present may be fairly attributed to it. It is only by the study of a large number of cases in which the organism is found that this point can be settled. Probably the most significant manifestation of influenza is a peculiar range of temperature. The variations seen are most puzzling and frequently wrongly interpreted. They often give the physician the greatest concern, especially since they occur so frequently in the course of pneumonia or otitis, they may lead to a suspicion that some serious complication, either medical or surgical, is present. The temperature is apt to be high, to fluctuate widely and irregularly without apparent cause. Its rise is sharp, but without chills; in its fall, which is quite as rapid, it frequently goes to subnormal. The want of correspondence between the general symptoms and the temperature is quite diagnostic. I know of no disease in which such high temperatures are seen with so few general symptoms as in influenza. From author's experience at the Babies' Hospital in New York City several definite clinical types stand out: 1. Pneumonias with unusual, often extraordinary, fluctuations of temperature or with a persistence of temperature after physical signs have disappeared. 2. Pneumonias running a protracted course, with slow resolution. Frequently there are recurring attacks. 3. Cases of otitis with very mild catarrhal symptoms, often only a moderate cough and a few coarse râles in the chest, but with a temperature quite out of proportion to the general or local symptoms. 4. Cases with very few or no catarrhal symptoms whatever, but with a very unusual temperature curve. 5. Unusual temperature curves accompanying tuberculosis and sometimes other diseases. 6. Cases resembling whooping cough, seen chiefly in older children, seldom in infants. Pfeiffer's bacillus has many points of likeness to Bordet's bacillus. There are also clinical resemblances between whooping cough and influenza which have not been sufficiently appreciated. Influenza often persists for from 6 to 8 weeks; it may be characterized by a paroxysmal cough, which is so like the paroxysms of pertussis that at times the two are indistinguishable. Most of the children who are reported to have recurrent attacks of whooping cough have in reality suffered from influenza. SACHS.

Ulcerative Angina. An Early Symptom in Typhoid—N. B. POTTER, Bost. Med. and Surg. Jour., July 23, 1914.

Author says that in 6 to 12 per cent. of cases of typhoid fever, one or more small superficial ulcers (so-called typhoid angina, or Bouveret's ulcer) occur on the anterior pillars of the fauces.

Usually they appear at about the same time as the roseola, but they may appear early enough to be of some value in the clinical diagnosis of the disease. If one remembers that this lesion may occur, it will not be mistaken for the ulcer of syphilis, diphtheria, croup, or scarlet fever.

SACHS.

Urobilin and Diazo Reactions in Typhus Fever—M. RABINOWITSCH, *Berliner klin. Wochenschr.*, Aug. 3, 1914.

In most cases of typhus fever the diazo reaction as well as the urobilin reaction may be obtained in the urine. The diazo reaction will already ensue very distinctly in the first days of the disease; it disappears mostly shortly before the crisis and may still be obtained after this. The reaction varies in intensity, but it stands in no relationship to the intensity of the affection. The urobilin generally appears in the urine of the typhus patient shortly before or after the crisis; time of appearance and duration vary with the case. The urobilin in typhus fever is hematogenous in origin, and is caused by the hemolytic properties of the infective agent.

MILL.

Typhus Fever and Paratyphoid Bacillus B.—E. JOB and J. SALVAT, *Bull. et Mém. de la Société méd. des Hôpitaux de Paris*, Vol. XXX, No. 21, 1914.

The occurrence of paratyphoid bacilli has been demonstrated in the blood stream of the most varying infectious diseases, as scarlet, tuberculosis, pneumonia, leukemia, etc. Authors found paratyphoid bacilli in the blood of patients with typhus fever. To what extent this secondary infection gives rise to disease symptoms cannot be stated. Both patients had diarrhea.

ZIMMER.

Paratyphoid, a Contribution to its Pathology—W. GLASSER, *Münchener med. Wochenschr.*, Sept. 22, 1914.

Clinical reports of 2 cases of paratyphoid, the course of which was very much the same as that of ordinary typhoid fever. They only differed from typhoid in some of their manifestations. The stools were watery, mostly brownish in color and mixed with mucus. Contrary to diarrheal typhoid discharges their odor was pronouncedly bad. The 2 patients suffered great pains in the splenic region. In one of the cases the spleen was hardly enlarged, in the other case it was somewhat larger than normally and palpable. Both cases showed roseola. The leukocytes were diminished in both patients. The diazo reaction was positive. The anatomical findings also corresponded to the characteristic typhoid lesions. There were catarrhalic inflammatory manifestations in the stomach and intestines, and moderate swelling of the lymph glands. In one of the cases there were very many intestinal ulcers in the lower small intestine and the entire large bowel. Both cases demonstrate that paratyphoid in spite of a few peculiarities may so resemble typhoid both in clinical and pathologico-anatomical respects that a diagnosis can only be made with certainty by means of a bacteriological examination.

MILL.

Acid Reaction of Pus in Pneumococcal Empyema of the Pleura—A.

NETTER and BOUGAULT, *Comptes rend. hebdom. des Séances de la Société de Biologie*, Vol. LXXVII, No. 21, 1914.

In 12 cases of pneumococcal empyema authors found a constant acid reaction, varying between 0.276 and 4.89 per liter calculated as formic acid. Formic acid was demonstrated qualitatively. Acetic acid could never be demonstrated.

ZIMMER.

Severe, Non-Diphtheritic Laryngeal Stenosis in Children—E. KÖCK,

Münchener med. Wochenschr., Aug. 18, 1914.

The "atypical form of pseudo-croup" is an affection that is little known, but is not infrequent and of great importance. Pyogenous infection of the laryngeal mucosa may give occasion to quite different disease pictures than the atypical form of pseudo-croup and phlegmonous laryngitis. Since the laryngeal mucosa is decidedly more affected by pyogenous bacteria than by diphtheria bacilli, it is essential that no intubation be made and primary tracheotomy be performed, if the presence of pyogenous agents has been demonstrated. However, if the pyogenous nature of the infection be only recognized after intubation has been performed, a secondary tracheotomy should be at once made in the place of intubation.

MILL.

Cases of Sprue Invalidated from the Tropics—H. B. HIATT and W. ALLAN,

Jour. A. M. A., Aug. 1, 1914.

Observations based on 3 cases of sprue from Porto Rico, 2 from China and one from the United States which was in all probability sprue. The clinical picture of sprue consists chiefly of gastro-intestinal symptoms—stomatitis, flatulence with great distension, diarrhea with large, pale, frothy, acid stools, atrophy of the intestinal mucous membrane with diminution in size of the liver and secondary anemia with loss of weight and strength; the course of the disease is chronic with a marked tendency to relapse. The sprue stomatitis consists in a red, bald appearance of the tip and edges of the tongue, sometimes nearly all of it being involved. Aphthous ulcers are common. The edges and tip of the tongue become sensitive and the patient often complains of a burning, prickling sensation, even while the tongue is still apparently normal. The diarrhea starts gradually; is of the early morning type until the case has progressed so far that bowel movements continue throughout the day. Straining and tenesmus are not common, but generally there is moderate pain and discomfort before stool and at other times from the passage of large amounts of gas along the bowel. The large gas production, combined with the atrophy of the intestinal wall and the thinning and weakening of the abdominal muscles, allow great distension, which is uniform over the whole abdomen and which remains constantly present. The stools are the most characteristic part of the picture. Their bulk is great. The odor is very disagreeable. They may be

watery or of the consistency of molasses, are putty-colored and have a strongly acid reaction. The fecal matter is intimately impregnated with fine bubbles of gas causing the stool to resemble ordinary apple-float very much in appearance, except for the color. Microscopically, the lack of fat digestion is striking; the numerous fat droplets may show a ring of varying thickness of fatty acid needles around the periphery, indicating that a slight amount of fat cleavage has taken place, but there seems to have been very little saponification. After the ingestion of meat, many meat fibers appear in the feces. Schmidt's hydrobilirubin test was very weakly positive in author's cases. The loss of flesh and strength may determine death from exhaustion. The blood shows a secondary anemia. SACHS.

Cardiac Arrhythmia in Diphtheria—E. B. GUNSON, Brit. Jour. Children's Dis., Sept., 1914.

Irregularities of the pulse occurring in 120 cases of diphtheria in children under 10 years of age were investigated by means of the polygraph. Sinus arrhythmia was constant with pulse rates below 100 per minute. Premature auricular contractions, occurring singly and infrequently, were present in 28 per cent. of cases investigated systematically, and constituted the sole irregularity in mild and moderately severe cases. Three cases, fatal from toxemia, developed no arrhythmia and no heart block. Five cases, 3 of which were fatal, developed a so called "cardiac paralysis" with marked arrhythmia due to frequent premature contractions. In 2 of the cases, the premature contractions led up to paroxysms of tachycardia. Premature ventricular contractions, auricular flutter, auricular fibrillation, and heart-block—apart from a prolonged a-c interval—did not occur in this series. No case of sudden death was met with, and judging from the more recent literature in cases which are carefully investigated, sudden or unexpected death is extremely rare.

SACHS.

Localization of Osteomyelitis—G. WILLIAMS, Brit. Jour. Surg., July, 1914.

The cases cited bear out the general idea that infection of bone is primarily one of the marrow, and therefore the medullary canal should be explored in all cases in which the X-rays do not give evidence to the contrary. In adults the localization of the infection is in the middle of the length of the shaft rather than at either end. In adults, the infective osteomyelitis may be so subacute in character as to suggest in its clinical features, a sarcoma rather than an infection.

SACHS.

RESPIRATORY AND CIRCULATORY ORGANS

A Diagnostic Point in Apical Disease—R. EHLMANN, Berliner klin. Wochenschr., Aug. 31, 1914.

According to observations of author it is possible that in monolateral or bilateral affections of the pulmonary apices there exists a

varying irritability of the musculus dilatator pupillæ which only becomes distinct when the musculus oculomotorius is paralyzed after administration by mouth of atropin or belladonna. MILL.

Palpability of Arteries—L. LANDÉ, *Deutsches Archiv f. klin. Medizin*, Vol. CXVI, Nos. 3 and 4.

There exists hardly any relationship between the palpatory findings of the arterial wall and its anatomical condition. The apparent rigidity of a large number of arteries is not explainable on the hand of its structural condition. The resistance of most arteries appearing thick-walled without being sclerotic, is not caused by hypertrophy of the middle coat. On the other hand, hypertrophy of the middle coat, especially in the presence of contracted kidney, seems to be a factor which cannot be entirely neglected when palpation of the arteries is resorted to. Apart from the marked "goose gullet arteries," it is impossible for the palpating finger to differentiate between a thickening of the arterial wall due to hypertrophy of the middle coat or arteriosclerosis. Only the sphygmogram may differentiate between these two conditions in certain instances.—The article does not lend itself to a more detailed abstract. It should be studied in the original. WESTERN.

Diastolic Blood Pressure in the Diagnosis of Affections of the Aorta—

J. S. SCHWARZMANN, *Wiener klin. Wochenschr.*, July 23, 1914.

Marked decline of the diastolic blood pressure confirms not alone the diagnosis of aortic insufficiency in the presence of other of its manifestations, but may also be sufficient to make the diagnosis of this condition when the diastolic bruit, its most important symptom, is absent. The diastolic blood pressure will thus assist in the recognition of aortic insufficiency, an affection which exists much more frequently than is usually assumed. Disturbances like headache, vertigo, and insomnia may only thus be properly interpreted. MILL.

Systolic and Diastolic Blood Pressure in Infectious Diseases—J. S.

SCHWARZMANN, *Zentralblatt f. innere Medizin*, 1914, No. 31.

High diastolic pressure points to a very grave condition, viz., the paretic state of the larger abdominal blood vessels and accumulation of the bulk of the blood within them. Decrease of systolic blood pressure with synchronous decrease of the diastolic blood pressure indicates that the decline of the systolic blood pressure is not caused by a decrease of cardiac force, but that it is due to a diminution of the vascular tone. Decrease of systolic pressure in the presence of increased diastolic pressure indicates decline of cardiac energy. WESTERN.

Causes of Death in Aortic Aneurysms—POHRT, *Münchener med. Wochenschr.*, Sept. 8, 1914.

The results of author's investigation as to the mode of death in

aneurysm of the aorta showed that there died from rupture 12 patients (24 per cent.), from compression of organs in the thoracic cavity 9 patients (18 per cent.), from affections of the circulatory organs (a) relative aortic insufficiency 12 (24 per cent.), (b) other affections of the circulatory organs 5 (10 per cent.); from pulmonary diseases as the consequence of engorgement of the lesser circulation 3 (6 per cent.), from embolus due to thrombus of the aneurysm 0 (0 per cent.), and from intercurrent diseases 9 patients (18 per cent.).

MILL.

Coronary Circulation—P. MORAWITZ and A. ZAHN, *Deutsches Archiv f. klin. Medizin*, Vol. CXVI, Nos. 3 and 4.

The blood supply of the heart muscle is dependent upon the arterial pressure. Increase of the arterial pressure by means of abdominal compression, infusion of blood or sodium chlorid solution, and adrenalin increases the amount of blood running through the coronary vessels. Adrenalin also dilates directly the coronary arteries. Adrenalin is the most efficient factor to increase the blood supply of the heart; in spite of this its administration in angina pectoris appears to be of no avail. Markedly accelerated cardiac activity produces conditions unfavorable to the cardiac blood supply. Irritation of the *accelerans cordis* causes dilatation of the coronary vessels; irritation of the *pneumogastric* generally diminishes the coronary blood stream.

WESTERN.

Suction Activity of the Heart—A. LEHNDORFF, *Deutsches Archiv f. klin. Medizin*, Vol. CXVI, Nos. 1 and 2.

Author opposes the commonly held opinion that the heart acts as a pressure and suction pump, maintaining that it merely works as a pressure pump.

WESTERN.

Congenital Heart Disease—C. H. DUNN, *Am. Jour. Dis. Child.*, Sept., 1914.

Congenital pulmonary stenosis is probably present in a case showing cyanosis, with enlargement of the cardiac dulness or palpable thrill, or both. In a child dying shortly after birth with the above symptoms, the lesion is probably present alone, but if it lives for some time, the stenosis is probably associated with some other lesion. When a murmur of congenital origin is present in a case with cardiac enlargement, but without cyanosis, it is probably due to a defective interventricular septum. A case showing a murmur without either cyanosis or enlargement, especially if the murmur is markedly transmitted into the vessels of the neck, or if it extends into diastole, is probably one of open ductus arteriosus alone. When the murmur has a "humming-top" note and extends throughout the cardiac cycle, the diagnosis of the lesion is almost certain. The prognosis in those cases with open ductus arteriosus alone is very good. When pulmonary stenosis is the sole lesion, the prognosis is very grave. In the other forms of congenital heart disease and

their combinations, there is evidence that any patient may survive and even live to adult life. Development and nutrition suffer to a varying degree, and many die young of gastrointestinal or infectious diseases.

SACHS.

Endocarditis in Children—F. M. CRANDALL, Arch. Pediatrics, Sept., 1914.

Patients in whom endocarditis begins before 12 years have a very important period before them. The physician who ignores the gravity of a cardiac murmur and lightly says that the child will grow out of it, is taking almost a criminal risk.—The patient with mitral regurgitant murmur alone, other things being equal, has a much better outlook than the one with a double mitral murmur, and vastly better than the one with an aortic murmur. An aortic lesion is a very dangerous thing in a child, but aortic insufficiency is fortunately rare in children.

WESTERN.

Ventricular Hypertrophy—T. LEWIS, Heart, Vol. V, No. 4.

Author describes a method of dissecting and weighing the human ventricles, which may be adopted as a basis for more exact measurement of hypertrophy than has hitherto been undertaken. An examination of the physical signs, checked by post-mortem observations, led the author to the conclusion that those signs which are customarily employed at the bedside are of little real value in differentiating between right and left ventricular preponderance. Einthoven's signs, as is shown by the electrocardiogram, of right or left preponderance, have much evidence in their favor. The signs of right preponderance in aortic disease, or of left preponderance in mitral stenosis, occasionally observed, are apparent rather than real discrepancies, for it can be shown that corresponding predominance of the muscle on one or the other side may exist in association with the valve lesion in question. It is probable that mechanical factors are by no means the only important causes of hypertrophy of the heart. The commonest type of hypertrophy is a uniform one. In renal disease this is the rule. In aortic disease it is almost as frequent as is hypertrophy with preponderance of the left ventricle. High blood pressure appears to be especially potent in creating a preponderance of hypertrophy of the left ventricle.

SACHS.

Defective Conduction in Auriculo-Ventricular Bundle—E. P. CARTER, Arch. Int. Med., May, 1914.

In the presence of lesions involving the conductivity of the auriculo-ventricular bundle, a distinct and characteristic type of electrocardiogram is obtained. To the ventricular contraction on which this depends, the term aberrant may be applied. This type of electrocardiogram is frequently associated with aortic valve disease; it is distinct from that of hypertrophy predominant in one ventricle. Bundle branch defects are usually accompanied by defects in the main trunk, suggesting that the junctional tissues as a whole have a

special pathology. The electrocardiographic pictures of aberrant beats are probably of considerable prognostic importance. SACHS.

Interpolated Extra-Systoles—M. DRESBACH and S. A. MUMFORD, *Heart* (London), Vol. V, No. 3.

A case of frequently interpolated extra-systoles of obscure origin, in an otherwise healthy young man, is described. The condition is comparatively rare, especially in hearts without a demonstrable lesion. In pathological hearts, it is also uncommon, but perhaps not so rare as formerly believed. From the electrocardiograms it is learned that the ectopic stimulus arises at a fixed focus in the right ventricle, and probably in the right branch of the A-V bundle, and that the contraction waves follow a fairly constant path through the basal portion of the ventricles and thence to the apex. The irregularity has been remarkably constant during at least three years.

SACHS.

Pulsus Paradoxus—M. SEMERAU, *Deutsches Archiv. f. klin. Medizin*, Vol. CXV, Nos. 5 and 6.

Pulsus paradoxus caused by mechanical factors is mostly pathognomonic of adhesive pericarditis. Dynamically produced pulsus paradoxus may be utilized in prognosis, as it points either to an impending cardiac weakness or to an increase in the negative intrathoracic pressure.

WESTERN.

ALIMENTARY TRACT

Acidity of Gastric Contents in Nurslings and Small Children—E. J. HUENEKENS, *Zeitschr. f. Kinderheilkunde*, Vol. XI, No. 4, 1914.

Observations on 5 children ranging in age between 9 months and 3 years. After a milk meal the acidity of the gastric contents was very low; it was somewhat higher after a test meal consisting of soup and vegetables. After a meal consisting of soup, meat and vegetables the acidity was so low in children below 1½ year that peptic digestion of the meat was rather impossible.

MILL.

Gastric Borborygmi—A. E. BARCLAY, *Archives Röntgen Ray* (London), Oct., 1914.

The annoying and persistently recurring rumbles that some people exhibit are generally supposed to be due to collections of air in the intestine. They are said to be the result of active peristalsis. This is not so, for they occur in the stomach, and the peristalsis in these subjects is comparatively feeble, owing to the thinning out of the gastric muscle. This thinning out is part of the atonic condition with which these sounds are associated.

SACHS.

Clinical Aspects of Gastric Hemorrhage—J. A. LICHTY, *Am. Jour. Med. Sci.*, Nov., 1914.

The statistics of hemorrhage from the stomach whether of hematemesis or melena, or as revealed by occult blood tests, or by string

tests, are of very little value. In the treatment of acute peptic ulcer, or acute exacerbation of chronic ulcer, especially when accompanied with hyperchlorhydria, food should not be held from the stomach at once. Surgical treatment for gastric hemorrhage has a very limited but definite field. SACHS.

Clinical Study of One Thousand Cases of Cancer of the Stomach—
J. FRIEDENWALD, *Am. Jour. Med. Sci.*, Nov., 1914.

Author draws the following conclusions: Of patients suffering with various gastric disturbances, 9.6 per cent. are affected with cancer while but 7.8 have ulcers. The largest proportion of cancers occur between the fortieth and sixtieth years of age, while the largest proportion of ulcers occur between the twentieth and fiftieth years. The greatest number of cases occur in males (588 males and 412 females). Of patients affected with gastric cancer there is an hereditary history of cancer in 9.4 per cent. A definite history of trauma occurs in 1.9 per cent. of cases. Anemia is present in 82 per cent.; chronic endocarditis in 11 per cent.; arteriosclerosis in 69 per cent. Seven per cent. give a direct history of former ulcer, and only in 23 per cent. could the cancer have formed from ulcer. A history of overindulgence in food or drink can be obtained in about half the number of cases of cancer. The greatest proportion of cancer cases present an anacidity, i.e. 89 per cent.; 3 per cent. show a normal acidity; 4 per cent. an hyperacidity, and 3 per cent. show a normal acidity; 4 per cent. an hyperacidity, and 3 per cent. a subacidity. Lactic acid is present in 81 per cent.; the Oppler-Boas bacilli in 79 per cent.; sarcinae in 32 per cent.; coffee-ground contents in 61 per cent. The average duration of life is less than one year in 66 per cent. of all cases, between one and two years in 22 per cent., and over two years in 11 per cent. Periods of improvement, including gain in weight, are not uncommonly observed for a short time in cancer of the stomach. Latent cancer occurs in 1 per cent. of the cases. Dysphagia is present in 7 per cent. of the cases and pain the most frequent of all symptoms in 93 per cent. Tender abdominal areas are present in 69 per cent. Anorexia and vomiting are most prominent symptoms, being present in 89 per cent. of cases. Hematemesis is present in 25 per cent. of all cases and melena in 19 per cent. Occult blood appears in the stools in 92.5 per cent. The tumor was sufficiently advanced to be palpable in 72 per cent. of cases, but only in 30 per cent. of these cases within a half year of the first appearance of symptoms, while in 60 per cent. of cases this symptom was manifested after the first 6 months. Clinically in 60 per cent. of cases the cancer is located at the pyloric area, in 7 per cent. at the cardiac area, and in 30 per cent. there is a general involvement. Primary gastric cancers occur in 99 per cent. and but 1 per cent. represent secondary growths. Dilatation of the stomach occurs in 47 per cent. of cases. Perforation occurs

in 2 per cent., and fever in 43 per cent.; ascites and edema in 21 per cent.; jaundice in 3 per cent., and metastases are present in 67 per cent.

SACHS.

Duodenal Ulcer—D. P. W. WILKIE, *Edinburgh Med. Jour.*, Sept., 1914.

A chronic duodenal ulcer may occasionally exist and give rise to none of the characteristic symptoms; the first evidence of such a silent ulcer is sometimes its perforation. Silent duodenal ulcers are met with most frequently in the subjects of arteriosclerosis. Some toxic or irritative factor, frequently associated with the colon or appendix, is found in a large proportion of these cases.

SACHS.

Phenolphthalein Test for Occult Blood in the Feces—H. SCHIROKAUER, *Deutsche med. Wochenschr.*, July 16, 1914.

Author observed a very marked phenolphthalein reaction in the feces of a patient who had been on a meat-free diet for 4 days. The control guaiac reaction made at the same time became weaker and weaker and was finally not observed any longer. Author is of the opinion that the reagents taken alone will cause an intense coloration in the presence of alkali.

Boas, the originator of this test, replies to the foregoing article in the same issue of the *Deutsche med. Wochenschr.*, as follows: Since the phenolphthalein test is very sensitive, it is necessary that the previous meat-free period should last from 8 to 10 days. Though it is true that the reagents alone may yield a positive result when too much potassium hydrate has been added, this circumstance does not diminish the value of the test since such an error will not occur in a fecal examination.

MILL.

Phenolphthalein Test for Occult Blood in the Feces—A. SCHNEIDER and v. TEUBERN, *Deutsche med. Wochenschr.*, Aug. 20, 1914.

Boas' phenolphthalein test for the detection of occult blood in the feces is a very appropriate and reliable method. In sensitiveness it surpasses Weber's and the aloin tests.

MILL.

Conditions Simulating Chronic Appendicitis—J. MORLEY, *Brit. Med. Jour.*, Sept. 12, 1914.

Author is of the opinion that the peritoneal band described by Lane probably never gives rise to trouble, so that the many ingenious operations devised for dealing with it are the outcome of misdirected enthusiasm. Jackson's pericolic membrane on the other hand may give rise to symptoms simulating appendicitis. A mobile proximal colon is predisposed from birth to chronic constipation, and symptoms resembling chronic appendicitis may thereby result. The commonest cause of erroneous diagnosis of chronic appendicitis is right tubo-ovarian disease, often of gonorrheal or septic origin. A spasmodic contraction of the right psoas muscle sometimes occurs, and on palpation may be mistaken for an abscess or neoplasm.

SACHS.

Cancer of the Cecum in Relation to Appendiceal Lesions—P. Y. TUPPER,
 Jour. Miss. State Med. Ass., Oct., 1914.

Malignant disease of the appendix is not uncommon. The new growth cannot be clearly differentiated from carcinoma microscopically, but clinically its deportment is definitely that of the endotheliomata elsewhere in the body. The malignant process is probably grafted on the appendix that has, as the result of inflammatory action, undergone cicatrization and partial or complete obliteration of its lumen. The removal of the involved appendix generally compasses the trouble, as secondary glandular involvement and metastases are rare. In rare instances the cecum seems to have been involved secondarily to and as the result of the cancer of the appendix, but definite proof of this is wanting. SACHS.

Cancer of the Colon—J. BURKE, Buffalo Med. Jour., Oct., 1914.

The differential diagnosis of cancer of the colon can best be considered by a study of the flexures, situations where the growths most frequently occur. Beginning at the cecum, we find two pathological conditions that can simulate carcinoma, appendicitis in old people and ileocecal tuberculosis. There are cases in which the differential diagnosis between cecum carcinoma and appendicitis in the beginning gives rise to great speculation, when there exist elevation of temperature and sometimes repeated chills, as well as acute local pain. But here, as well as in all cases, the taking of a very careful previous history up to the time, and exact detailed symptomatology of the present illness, ought to be of great diagnostic aid. Some observers have claimed that temperature in itself speaks against carcinoma, but in this they absolutely err, because temperature elevation is not a seldom phenomenon in gastrointestinal cancer. Fromme, of Halle, claims that this fever in cancer is due to destruction of the primary tumor, large lymph channels being opened up, and a great amount of bacteria brought to the lymph glands and their toxins permeating the blood. Hence I would suggest in the differentiation of bowel carcinoma from appendicitis in elderly people, that we pay absolutely no attention to the temperature as against carcinoma, but rather depend more upon the previous history of the patient. However both conditions demand early surgical attack, and one who opens the abdomen to operate an appendix ought to be ready to do a radical operation in case his pathology proves to be a cancer. Yet a perfect diagnosis of carcinoma would permit a few days' preparation, and in my opinion old people can stand a few days toning up. SACHS.

Etiology of Hemorrhoids—A. SCHMINCKE, Münchener med. Wochenschr., Aug. 11, 1914.

Hemorrhoidal disease consists in a dilatation of the finer branches of the veins of the hemorrhoidal region (varices ramusculaires). This dilatation is a process progressing with age. It must be as-

cribed to the mechanical factors connected with defecation. The descending fecal column presses the blood into the small ramifications of the veins in the hemorrhoidal region, from which it cannot escape quickly enough on account of the synchronous pressure of the abdominal wall. The changes ensuing in the hemorrhoidal veins may be explained on the hand of a functional hypertrophy of the vascular wall with secondary insufficiency. The inflammation of hemorrhoids is a secondary process, which ensues quite readily by the bacterial invasion into the injured structures of the hemorrhoidal zone.

MILL.

Syphilitic Hepatic Disease—W. T. CHENEY, *Am. Jour. Med. Sci.*, Aug., 1914.

In any case that appears to be cirrhosis of the liver judging from the clinical history and physical signs the blood should always be examined for syphilis. If the Wassermann reaction is positive, vigorous specific treatment will often produce marvelous improvement, not to be expected in any other way; but even when the reaction is positive, the liver disease may not be luetic, and so specific therapy may prove of no avail. Syphilitic cirrhosis of the liver is a common form of hepatic disease, and there is no way to tell which case is luetic and which is not, except by the blood test. SACHS.

Subacute Atrophy of the Liver in Childhood—R. H. CHISOLM, *Brit. Jour. Children's Dis.*, Sept., 1914.

Acute yellow atrophy is by no means unknown in childhood. The subacute form of the disease has attracted less attention, due firstly to the fact that its clinical picture is less striking than is that of the acute form of the disease, and secondly, the symptoms and signs seem less certain in their significance and far from pathognomonic. Jaundice is usually the first symptom to attract attention. When once established, it usually tends to become progressively deeper. Ascites was present in 3 out of 11 cases. The liver was somewhat enlarged at some period of the disease in all except 2 cases. Abdominal pain was of inconstant occurrence. Light colored stools were the rule. The disease presents a series of gradations between declared acute atrophy of the liver and cirrhosis. From the former, the differential diagnosis depends on the longer history and the less acute nature of the symptoms. SACHS.

Acidosis and Cholelithiasis—R. BENS AUDE, *Bull. et Mém. de la Société méd. des Hôpitaux de Paris*, Vol. XXX, No. 18, 1914.

The case of a woman who had had typical attacks of gall-stone colic accompanied by icterus. In the course of a cholecystitis and pericholecystitis typical coma with Kussmaul's respiration together with acetonuria supervened. The case terminated in coma. The urine had never shown the presence of sugar. ZIMMER.

Acetonemic Coma and Fatty Degeneration of the Liver—C. AUBERTIN and P. LEGRAIN, *Bull. et. Mém. de la Société méd. des Hôpitaux de Paris*, Vol. XXX, No. 17, 1914.

In a woman, 24 years old, suffering with chronic alcoholism, polyneuritis and chronic meningitis, there ensued coma. Aceton was found in the urine and cerebrospinal fluid. This was probably the result of the fatty degeneration of the liver cells, which condition was demonstrated at autopsy. Alkali therapy had a temporary beneficial influence upon the comatose manifestations. ZIMMER.

The Functional Ability of the Pancreas (First Paper)—A. LANDAU and A. REASNICKI, *Zeitschr. f. klin. Medizin*, Vol. LXXX, Nos. 3 and 4.

The detection of trypsin in the stomach contents is more readily accomplished in the presence of a low degree of acidity. For clinical purposes only positive results are of value. If trypsin cannot be demonstrated in the stomach contents it does by no means indicate that the external secretion of the pancreas is pathologically altered. Einhorn's duodenal sound should be employed in cases in which none or but small quantities of trypsin can be demonstrated in the gastric contents. The direct examination of the duodenal contents for the existence of pancreatic ferments evinces the status of the external secretion of the pancreas. The secretion of trypsin, diastase and lipase does not take place at the same ratio. For this reason the duodenal contents should be examined for the presence of all the three ferments. WESTERN.

The Functional Ability of the Pancreas (Second Paper)—A. LANDAU and A. REASNICKI, *Zeitschr. f. klin. Medizin*, Vol. LXXX, Nos. 3 and 4.

Experiments with pancreatic secretion, obtained from a case of traumatic fistula of the pancreas, showed that the pancreatic diastase is affected by the gastric juice and free HCl in the same manner as the salivary diastase. A minimum amount of free HCl converts diastase into an inactive state; immediate neutralization cannot prevent this inactivation. If diastase is encountered in the stomach contents it is impossible to determine whether it is derived from the saliva or the pancreas. The examination of the gastric contents for diastase in order to diagnose pancreatic disease or to prove a regurgitation of the duodenal contents is of no clinical value whatever. WESTERN.

Pancreatitis as a Possible Complication of Parotitis—N. DRACINSKI and J. MEHLMANN, *Deutsche med. Wochenschr.*, July 30, 1914.

In an epidemic of parotitis there were 3 cases which exhibited herpes, violent headache, constipation, vomiting, collapse, febrile delirium, pain above the umbilicus, marked acetonuria and pulse retardation. It is probable that these symptoms were due to a complicating pancreatitis. MILL.

NERVOUS SYSTEM

The Myoclonias-Paramyoclonus Multiplex—H. H. HOPPE, Lancet-Clinic, Sept. 12, 1914.

There is a diversity of opinion as to whether or not myoclonia aside from Friedreich's disease should be considered as a distinct clinical syndrome. The moment we depart from the type of myoclonus described by Friedreich we are lost in a maze. Only a small part of the so-called cases of paramyoclonus which have been published answer the requirements laid down by Friedreich's description. If we keep in mind that the convulsive movements are quick, lightning-like, affect single muscles which cannot be contracted by the will, that these contractions occur bilaterally in symmetrically situated muscles, that they are arrhythmical and asynchronous, that they have little or no locomotor effect, and that they never produce movements which could suggest purpose or gesture, we can easily rule out tic. Spasms always have a locomotor effect, are more apt to be clonic than tonic, usually unilateral, and limited to muscles or groups having the same nerve supply.

SACHS.

Bilateral Extensor Response in States of Unconsciousness—C. O. HAWTHORN, Practitioner (London), Sept., 1914.

The association of a bilateral extensor response (Babinski's sign) with coma does not necessarily mean an organic brain lesion. The coma itself, however produced, may be sufficient to establish in the central nervous system the conditions upon which the appearance of the extensor response depends.

SACHS.

Latent Meningeal Carcinoma—H. EICHHORST, Deutsches Archiv f. klin. Medizin, Vol. CXV, Nos. 5 and 6.

A woman, 50 years old, died of what was diagnosed as carcinoma metastases in the spinal column and the spinal meninges with compression of the lumbar chord. The autopsy showed no macroscopic changes in the vertebræ, meninges and the cord. The microscope, however, demonstrated extensive carcinomatous changes of the spinal marrow and its soft membranes.

WESTERN.

Unusual Type of Hereditary Disease of the Nervous System—F. E. BATTEN and D. WILKINSON, Brain, Vol. XXXVI, Parts III and IV.

A familial and hereditary disease, having symptoms resembling disseminated sclerosis, is described. At least 6 males were affected in two generations. The subjects of this disease are almost always males, and the condition is transmitted by unaffected females. Those affected are either congenitally diseased or exhibit symptoms in the first months of life, the progress of the disease being very slow. They are mentally defective and ataxic, show nystagmus, speech defects, and defective development with weakness and spasticity of the lower limbs. It is considered probable that these cases belong to the

type of familial disease described by Pitizaeus and Merzbacher under the title "Aplocia axialis extracorticalis congenita." SACHS.

Outlook in Epilepsy—W. A. TURNER, Brit. Med. Jour., Oct. 17, 1914.

The most that can reasonably be expected in epilepsy is the arrest of the fits, in conjunction with a mental condition that the patient is able to attend to his business and earn a living according to his vocation. In the epilepsy of infancy, there is a remarkable tendency to temporary arrests or remissions of the fits, which frequently takes place about the fourth or fifth year, a remission which may last for some years, or until puberty. But, as a rule, this type of the disease offers a very unsatisfactory prognosis because many of these cases have organic focal brain lesions. The epilepsies of puberty and adolescence which are the common periods for the onset of the idiopathic disease are, as a rule, not unfavorable types as regards prognosis; provided that the fits are not too frequent, too severe or of a psychical character, and that treatment is undertaken early. The late epilepsies, those arising after 30 or 35 years, are more favorable types of epilepsy, provided that the seizures are not symptomatic of a cerebral tumor or other organic lesions of the brain, and that alcoholism may be excluded. SACHS.

Disturbances of Sleep—C. HAPPICH, Münchener med. Wochenschr., Aug. 25, 1914.

The disturbances of sleep are mediately caused by the brain; the substrate in the brain may be of a cellular or vascular nature, or may depend upon an alteration in the relationship between cortical cells and blood vessels. It is essential that the cerebral blood vessels be in a special condition in order that sleep may ensue and continue. This special state or behavior of the blood vessels may be prevented by impulses from the cortical cells or by the irritation or alteration of the vascular system itself. MILL.

The Weight of the Brain of Psychopaths—A. SCHÖNFELD, Prager med. Wochenschr., 1914, Nos. 14 and 15.

A very detailed article which has to be read in the original. The average weight of the brain is greater in the healthy subject than in the psychopath; in the mentally healthy male its weight is 1400 grams, while it weighs but 1320 grams in the mentally deranged man; in the mentally healthy woman the weight of the brain amounts to 1275 grams, while its weight does not exceed 1205 grams in the psychopathic female. MILL.

URINARY ORGANS—MALE GENITALIA

Renal Changes in Poisoning with Oxalic Acid and Potassium Oxalate—

R. KRÜGER, Virchow's Archiv, Vol. CCXV, No. 3.

In oxalic acid poisoning there ensues an excretion of calcium oxalate (like the normal calcium excretion), especially in the con-

volute tubules and to a lesser degree in the glomeruli. The crystals are found in the lumen as well as in the epithelia. The supervening anuria is caused by the damaged vascular function. WESTERN.

Mixed Forms of Nephropathies—P. v. MONAKOW, *Deutsches Archiv f. klin. Medizin*, Vol. CXVI, Nos. 1 and 2.

There are cases of kidney disease in which the sodium chlorid excretion is much disturbed, but in which nitrogen elimination is either not at all or but very slightly diminished. Uremic manifestations are usually missing in such cases; blood pressure is, as a rule, low. On the other hand, there is a tendency to the formation of edema. However, extensive and persistent edemas are only formed when there is a synchronous disturbance in the peripheral vessels. Additions of sodium chlorid to the diet are retained and lead mostly to an increase in body weight. At the same time the amount of the urine decreases. There are, however, also instances of sodium chlorid retention without change in body weight. Additions of urea influence the diuresis favorably in cases with isolated disturbance of sodium chlorid excretion. Urea may act as a diuretic in such cases after all other diuretics have proved of no more use. Such hypochloruric nephropathies occur per se only in acute cases. They are caused by alterations in the tubuli contorti. Since these have a pronounced ability to regenerate a cure is not infrequent.—On the other hand, there are cases in which the sodium chlorid excretion is normal, but the nitrogen excretion is disturbed right from the onset. In these cases the blood pressure is high and there are manifestations of chronic uremia. Here sodium chlorid acts strongly diuretic but urea remains without a special influence. In these instances we have an affection of the glomeruli, but the glomeruli are hardly at all affected. Nitrogen retention takes place in the tissues in a large degree, but the retention nitrogen of the blood is not markedly increased. WESTERN.

Urolithiasis in the Negro—E. PFISTER, *Archiv f. Schiffs u. Tropen Hygiene*, Vol. XVII, No. 7.

The colored race does not suffer much with urolithiasis. In countries even where bilharziosis is endemic the negro is as a rule not subject to urinary calculus. The reason for this is as yet unknown. Since a bacterial infection may be at the bottom of the calculus formation, it is well possible that the comparative immunity of the negro race to bacterial infections may be the cause for the infrequent urolithiasis. FRY.

Pyelography and Renal Dilatation—J. W. T. WALKER, *Brit. Jour. Surg.*, July, 1914.

Hydronephrosis presents two stages in its development, (1) a stage during which symptoms alone are present, and (2), a stage

where a swelling is constantly or intermittently found in the loin. When the diagnosis can be made in the first stage, an operation can be performed which will prevent the further destruction of kidney tissue. Apart from pyelography, this cannot be done with certainty. In the class of cases where there is no obvious cause of obstruction, such as calculus, movable kidney, etc., at operation, the block will be found to be due to congenital stenosis, or valve formation at the utero-pelvic junction, or to the pressure of an aberrant renal artery. Here pyleography finds its most striking application.

SACHS.

FEMALE ORGANS OF GENERATION—PREGNANCY— PARTURITION—INFANTS

Sudden Death during the Puerperium—P. RUDAUX, Med. Press (London), Oct. 14, 1914.

A heightened blood pressure, persisting the first few days after delivery, may explain the occurrence of delayed asystole, or attacks of acute edema of the lung. This is plainly a manifestation of myocardial degeneration. Fatal syncope occurs in women rendered extremely anemic by hemorrhage. In other cases it may result from a nervous shock produced by powerful emotion, fright, etc. Spontaneous coagulation may occur in the heart of a woman rendered very anemic during the puerperium. Latent pericarditis may also precipitate a fatal result at this time. Infection, especially localized in the venous system, dominates this period as a cause of sudden death and an embolism from a phlegmasia alba dolens, or from latent phlebitis frequently results therefrom.

SACHS.

Korsakow's Psychosis Occurring during Pregnancy—D. K. HENDERSON, Johns Hopkins Hospital Bull., Sept., 1914.

The pregnant state must in certain cases be recognized as an important etiological factor in the production of peripheral neuritis, and of that condition known as Korsakow's syndrome. The neuritis caused may be either local, affecting one nerve or one limb, or diffuse, affecting all the limbs, and certain of the cranial nerves. The mental disorder characteristic of the condition is usually associated with a generalized polyneuritis, but, as evidenced by one case reported by author, it may occur alone. The frequent history of hyperemesis gravidarum in association with the generalized forms of the disorder is so striking that it suggests a possible line of approach as to the elucidation of the nature of the toxin. Those patients who in previous pregnancies have suffered from severe vomiting, or other serious toxic phenomena, should be strongly urged to avoid any further pregnancies.

SACHS.

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